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Green Innovation in Educational Institutes of China: Mediating Role of Green Value Co-Creation

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The development of green dynamic capabilities in the educational sector of China is playing a great role for the institutes by offering green opportunities to teachers and students through which they can get inspired to accept the ecological administration to supplement the green reputation of the institute and thus gain a competitive advantage. The present study thus has been conducted to evaluate the effect of green dynamic capabilities, innovative finance and green innovation strategy on green innovation with the mediating role of green value co-creation. To further carry out the research, a quantitative-based survey methodology has been used to collect data from 350 China's teachers who were teaching in various universities. The received complete questionnaires were 330 that were later analyzed using SPSS and AMOS. Results indicated that there is a significant relationship between GDC and GI. Innovative finance also significantly impacts green innovation. The green innovation strategy also significantly impacts green innovation. Mediation of green value co-creation was significant between GDC and GI, IF and GI and GIS and GI. In addition to a valuable enhancement in the growing body of literature, this study contributes by assisting the education sector to adopt such practices as defined in the paper. It may also contribute to helping the policymakers to develop policies that are related to green innovation. Furthermore, the paper explores the green financial aspect for organizations. So, this study has multiple theoretical and practical contributions.

Keywords: *Green Dynamic Capabilities; Innovative Finance; Green Innovation Strategy; Green Innovation; Green Value Co-Creation.*

Introduction

The role of educational institutes is of great significance in structuring the economy and social foundations of the China country (Kikulwe & Asindu, 2020; Siriattakul, Jermsittiparsert, & Abdurrahman, 2019; Suherlan, 2017). That's why the institutions of the educational sector in China must adopt such ecological practices, which can contribute to fulfilling social obligations (Castro-Pardo, Fernandez, Martinez, & Martin, 2020; Famiola & Wulansari, 2019; Ragazzi & Ghidini, 2017; Ribaudo, 2020). Green Innovation must be adopted by the higher educational institutes of China so that an instructive environment can get created in the country (Bahzar, 2019; Gudalov & Treshchenkov, 2020). The development of green dynamic capabilities in the educational sector of China can help the institutes offer green opportunities to teachers and students through which they can get inspired to accept the ecological administration to augment the green reputation of the institute and thus gain a competitive advantage (Arrieta, 2020; Bahzar, 2019; Soewarno, Tjahjadi, & Fithrianti, 2019; Zandi, 2019). Such dynamic capabilities help develop creative ideas regarding introducing green innovation in the institutes, which requires strong and effective leadership (Muangmee *et al*., 2021; Rumanti, Samadhi, Wiratmadja, & Reynaldo, 2017). It is because the leaders can motivate other people in the institution so they can also perform practically in an improved way (Gunawan & Fraser, 2016; Huaping Sun, Edziah, Sun, & Kporsu, 2019). The pandemic of COVID-19 emerged in 2020 worldwide, which led to massive trouble for the economies of all nations (Pu *et al.*, 2021). China's educational sector was also significantly impacted, which had to encounter several implications to ensure sustainability in the working patterns of different educational institutes (Gao *et al.,* 2018). For this purpose, the institutes of China can adopt different green innovation strategies through which green value co-creation can be promoted and implemented to introduce sustainable innovation in the country (Garvey, Ventura-Marco, & Vidal-Melia, 2021; Saeidi *et al.,* 2021; Singh, Del Giudice, Chiappetta Jabbour, Latan, & Sohal, 2022; Yousaf, 2021). Therefore, keeping in mind the importance of green innovation for the educational department of China (Fitriani, Zubaidah, Susilo, & Al Muhdhar, 2020; Soewarno *et al.,* 2019), this research study is focused on exploring the methods through which green innovation can get adopted by the various educational universities of China.

The educational institutes have thus been persuaded to find and implement such solutions which can prove beneficial in dealing with the impacts of COVID-19 so that they can get rid of all the problematic situations both financially and non-financially and develop resilience in their systems (Gao *et al.,* 2018; Pu *et al.,* 2021; Sarisky, 2021). Several environmental concerns are getting recognized, such as climate change, water pollution, air pollution, etc., and all these problems require serious consideration to identify viable solutions

which can help resolve all these issues (Byrka-Kita, Czerwinski, & Gola, 2020; Rumanti *et al.,* 2017; Tetrevova, Jelinkova, & Munzarova, 2021; Zandi, 2019). The previous research studies are primarily focused on analyzing the significance of green innovation for firms, organizations, and small and medium enterprises (SMEs) (Muangmee *et al.,* 2021; Huaping Sun *et al.,* 2019). Still, the number of research studies regarding introducing green innovation in the educational sector is scarce, but this aspect is also critical to understand. The green dynamic capabilities, innovative finance, and green innovation strategies have not been studied from the perspective of universities in past studies. These aspects leave a gap in knowledge in the previous research.

Green innovation is to work in the way for developing services or manufacturing the products that are environment friendly. The value creation in green innovation is necessary to protect the environment and develop the goals based on sustainability for innovative performance. The innovative finance is to work on the financial activities in the critical way to get the better sustainability in the environment and it has become possible with latest technology.

One of the most important aspects of dealing with different environmental concerns is educating the people (Bahzar, 2019; Gunawan & Fraser, 2016; Soewarno *et al.,* 2019). Educational institutions are responsible for educating people, and the role of teachers is very critical in this aspect (Kore, Koul & Verma, 2022; Zandi, 2019). Therefore, teachers should realize their responsibilities and get them fulfilled appropriately (Berejena, Kleynhans & Vibetti, 2020; Mahalingam, 2022; Zandi, 2019). The present research study has contributed considerably to the existing literature to fill the gap in past literature. The current study is thus focused on investigating the role of green dynamic capabilities, innovative finance, and green innovation strategies for the introduction and adoption of green innovation in different universities in China (Hayee *et al*., 2021). Thus this research is aimed at conducting a study so that the horizon of existing literature can get expanded.

The green innovation is necessary for taking the reasonable actions for environment protection. In the educational institutes of China, the green innovation is necessary because the advanced and developed countries have introduced this concept in their educational sector. The green innovation has changed the student environmental behavior and it has also increased the level of sustainability in the working of educational institutes in the educational institutes of Copenhagen.

The research objectives help in defining the scope and significance of any study. That's why the following research objectives have been designed for the current study so that the aspects which are being addressed in this study can get explained in clear terms:

- To understand the relationship between green dynamic capabilities and green innovation among the teachers of Chinese universities.
- To study the relationship between innovative finance and green innovation among the teachers of Chinese universities.
- To discover the relationship between Green Innovation Strategy and Green Innovation among the teachers of Chinese Universities.
- To analyze the mediating role of Green Value Co-Creation in the relationship of Dynamic Capabilities, Innovative Finance, and Green Innovation Strategy with Green Innovation among the teachers of Chinese Universities.

This research study is significant as it highlights the importance of an inspiring environment in educational institutes so that dynamic capabilities can be developed and green innovation can be implemented (Famiola & Wulansari, 2019; Gao *et al.*, 2018). Green innovation can help the institutes avoid all the negative impacts resulting from excessive power consumption at institutions through which the condition of the environment can also get sustained (Aragones-Jerico, Kuster-Boluda & Lopez, 2020; Khoma & Vdovychyn, 2021; Muangmee *et al.,* 2021). The results of the present research can help educational institutes strengthen their knowledge base regarding adopting green innovation strategies and practices (J. Chen, Qi, Gao, Li & Song, 2021; Pu *et al.,* 2021; Ragazzi & Ghidini, 2017; Vinte, Smeureanu, Dardala, & Reveiu, 2021). This aspect can also get added to the policy-making process of the educational institutes. It is essential to conduct this research so that the importance and significance of institutional characteristics can get highlighted, which are crucial in achieving the target of implementing green innovation in the educational sector (NCUBE & Koloba, 2020; Singh *et al.,* 2022; Soewarno *et al.,* 2019; Yousaf, 2021). For this purpose, technology is undeniable because today's world is getting more advanced in technology daily, and innovation can only be introduced with the help of technology (Suherlan, 2017). The use of technology requires a specific set of expertise and skills, which can only get developed with proper technical education (Skare & Riberio Soriano, 2021; Yousaf, 2021).

Literature Review

Theory of Planned Behaviour

To forecast a person's intention to engage in a behaviour at a particular time and location, the Theory of Reasoned Action (TRA) was renamed the Theory of Planned Behavior (TPB) in 1980 (Conner & Armitage, 1998). The hypothesis was developed to describe all actions people can exercise self-control over. This model's most crucial element is behavioural intent, which is impacted by attitudes toward the probability that a behaviour will result in the desired outcome and a personal assessment of the risks and advantages of that result (Ajzen, 1991).

The TPB asserts that three different types of considerations influence human conduct: behavioural beliefs, normative views, and beliefs about the existence of elements that may help or hinder the performance of the behaviour. Behavioural beliefs are ideas about the likely outcomes of the behaviour (control beliefs). In their opinion or ideas, behavioural beliefs result in a positive or negative attitude toward the behaviour, normative beliefs provide a sense of societal pressure or an arbitrary standard, and control beliefs produce a sense of behavioural control or self-efficacy. Perception of behavioural control is a moderator for the influences of attitude toward the conduct and subjective norm on intention (Bosnjak, Ajzen, & Schmidt, 2020).

This study underpins the theory of planned behaviour (TPB), which connects green strategies, practices, or capabilities with green innovation. According to the theory of planned behaviour (TPB), having an optimistic outlook increases behavioural control and social pressure, raising an individual's behavioural intention (Antelm-Lanzat, Gil, Cacheiro-Gonzalez, Perez-Navio, & Fonseca-Pedrero, 2020; Azevedo, Carvalho, & Machado, 2011). The theory of planned behaviour explains how to manage people's attitudes and behaviours. People in the organization adhere to the standards and conduct that are presented by senior management (Al-Jundi, Shuhaiber, & Al-Emara, 2022; Zebrowska-Suchodolska & Karpio, 2022). Therefore, linking the TPB model to this model leads to the conclusion that green strategies and capabilities can be purposefully embraced because it concerns the manager's attitude toward environmental innovation. It also relates to the customer's attitude. Higher-level management instructs staff to use environmentally friendly practices. This leads to the enhanced capabilities of the employees for a clean environment. According to several studies, adopting environmental measures decreases carbon dioxide emissions, customer loyalty and satisfaction, innovation, competitive advantages, and economic benefits (Fuentes, 2015). As a result, the manager's behavior towards creating a green environment in the firm can lead to enhanced capabilities and adoption of green strategies to achieve green innovation. Thus, our study intends to examine green dynamic capabilities, green innovation strategies, innovative finance, green value co-creation, and green innovation. So, our theoretical framework is based on this theory (McCullough, Patrick, & Boni, 2022; Pitts, 2022).

Green Dynamic Capabilities and Green Innovation

Organizations require dynamic capabilities to respond to change. The organization's dynamic capability can potentially convert resources into outcomes (Amaranti, Govindaraju, & Irianto, 2019). This study is based on the data collection from the respondents for notable organization. However, these outcomes need to be clarified, and how the green dynamic capabilities help achieve green innovation must be studied. Performance in terms of green innovation is dependent not only on current capabilities but also on an organization's capacity to modify those capabilities to develop new ones. Dynamic capability aids businesses in identifying and seizing opportunities as well as reconfiguring crucial knowledge at multiple organizational levels (Bogers, Chesbrough, Heaton, & Teece, 2019). Furthermore, this study has used the primary data for its findings and its statistical findings validated the results of this research. A key mechanism for transforming knowledge management skills into performance at the corporate level is dynamic capability. (Albort-Morant, Henseler, Cepeda-Carrion, & Leal-Rodriguez, 2018) Asserts that the capacity for dynamic capabilities enhances the efficacy of both green product innovation and green process innovation. But the role of supply chain integration in this link can also be studied.

According to (Amaranti *et al.,* 2019), green dynamic capabilities are one of the factors linked with green innovation. Green dynamic capabilities and innovation have been linked in past studies done on manufacturing companies (Qiu, Jie, Wang, & Zhao, 2020). However, the studies should also clarify this linkage's mediating or moderating factors. In response to this growing concern for environmental sustainability and green innovation, green dynamic capacities must be improved (Dohan, Green, & Tan, 2017; Joshi & Dhar, 2020). This study was done in the handicraft manufacturing sector, but such a relationship should also be studied in other sectors to get varied results. Green innovation increases due to green dynamic capabilities, enabling businesses to adopt innovative sustainable solutions for their clients (Eriksson, 2014; Qiu *et al.,* 2020). The company's management prioritizes developing employees' capacities to develop novel ideas and solutions for environmentally friendly business practices and green products (Tirado & Guillén, 2017). However, it is needed that other resources for green innovation must also be considered for achieving green innovation. Hence based on the above studies, we can formulate our hypothesis (Konam & Rao, 2021b).

H1: Green dynamic capabilities have positive a significant impact on Green innovation.

Innovative Finance and Green Innovation

It is frequently asserted that financial resources strongly correlate with an organization's capacity for innovation. But the studies need to pay more focus to green financing. (M. Song, Chen, & Wang, 2018) found that financial constraints limit innovative capacity. (Jin, Zhao, & Kumbhakar, 2019) Discovered a link between financial resources and firm innovation productivity using data from the Chinese manufacturing sector. However, this relationship needs to be studied in other sectors also. According to (García-Quevedo, Segarra-Blasco, & Teruel, 2018), financial resources impact both the decisions that businesses make regarding innovation and the outcomes of those actions. According to (Popp, 2019), improved financing limitations lead to higher innovation efficiency of businesses because they might force businesses to make the best investment options, which boosts capital efficiency. However, the studies should pay a closer look at green innovation specifically.

Recently, literature has concentrated on the impact of innovative finances on green innovation. (Noailly & Smeets, 2016) Examined the impact of financial constraints on innovation activities in clean energy versus fossil energy technologies for 1300 European firms between 1995 and 2009. They concluded that financial constraints have a role in a company's decision to start an innovative initiative. These studies should also be conducted in developing countries for a more comprehensive look at the results. Studies on innovative finance for green innovation are still scarce, despite (Noailly & Smeets, 2016) 's study, a preliminary effort to offer empirical proof of the link between financing sources and energy innovation. Using a sample of Chinese listed companies between 2001 and 2017, (Yu *et al,* 2021) 's study examined the influence of innovative finance on encouraging green technologies. They also examined how green finance rules help businesses overcome financial barriers to green innovation. Green innovation is proven less capable when businesses face more significant financial restraints, and privately held companies are generally more at risk than government ones. Green finance helps to reduce financial restrictions, which leads to green innovation. But instead of

just focusing on the direct link between these variables, the mediating role of green value co-creation should also be examined. So, based on the above studies, we can formulate our hypothesis (Levine, 2021).

H2: Innovative finance has a positive significant impact on green innovation

Green Innovation Strategy and Green Innovation

Intending to create collaboration between the external environment and work conditions, GIS is a strategy used by businesses to implement green technology or eco-friendly management to enhance their operation and production activities and minimize their detrimental environmental effects (Ge et al., 2018). Studies have shown that a strategic orientation encourages corporate innovation and equips businesses to adapt swiftly to market changes and satisfy client demands. But, particular focus should be paid to Green innovation strategies. To reduce expenses and waste, GIS first promotes the efficient use of natural resources. Second, the use of GIS by businesses demonstrates their proactivity in managing their business activities in light of environmental challenges (W. Song & Yu, 2018).

A past study examined the relation between green innovation strategy and green innovation. It was revealed that GIS impacts green innovation in an organization as it helps to use clean resources (Y. Sun & Sun, 2021). This research has collected the primary data from the target respondents for its findings. However, this study was on the manufacturing sector. Although this sector contributes to adverse environmental effects, other sectors must also study green innovation and green innovation strategies. So, based on the above studies, we can formulate our hypothesis.

H3: Green innovation strategy has a positive significant impact on Green Innovation

Mediating the Role of Green Value Co-Creation

Green value co-creation, which eventually ends in green innovation, results from green dynamic capabilities. According to (Conboy *et al,* 2020), the organization's supply chain is connected to its green dynamic capabilities. The supply chain's green capabilities include ecological involvement, eco-design, promotion, supply, labelling, and green production. These aspects are vital to the growth of the green co-creation value with consumers' participation (Chih *et al.*,2019). The co-creation of green values is crucial for understanding how green innovation works. Through environmentally friendly processes and green activities, green dynamic capabilities increase the co-creation of green value for leading green innovations. However, this role should also be examined according to two dimensions of green innovation.

The green innovation strategy results in the co-creation of green value, a byproduct of introducing green innovation into enterprises (Li & Huang, 2017). Utilizing eco-friendly materials in product production increases customer value, encouraging businesses to develop value co-creation strategies to pursue green innovation. Therefore, the focus of this study is also on the mediating role of value co-creation. Co-creating green value is essential for green innovation through green strategies (Saggi & Jain, 2018). Using environmentally friendly materials, such as biodegradable material, for product packaging is vital to any firm's green innovation plans. Green strategies must be the catalyst for value co-creation and consumer comprehension for green innovation to succeed over a more extended period. It enhances the co-creation of green values, which ultimately meets customer demands for environmental health and plays a significant role in waste management (Wagner, 2018). Also, this research has used the primary data for its findings and significant results. However, the dimensions of green value co-creation should also be studied.

Innovative finance leads to better production of innovative products and also helps to reduce environmental pollution through such clean green products (Jin *et al.,* 2019). In this way, customer value is enhanced, impacting green value co-creation. Green value co-creation contributes toward achieving green innovation in any firm (Saggi & Jain, 2018). However, there is a scarcity of research on these relationships in a single framework.

Based on the above studies, we can formulate the following hypothesis.

H4: Green value co-creation has a positive mediating impact on the relation between Green dynamic capabilities and Green innovation.

H5: Green value co-creation has a positive mediating impact on the relation between Innovative finance and Green innovation.

H6: Green value co-creation has a positive mediating impact on the relation between green innovation strategy and Green innovation.

Figure 1 of the study is explaining the relationship between different variables with green innovation.

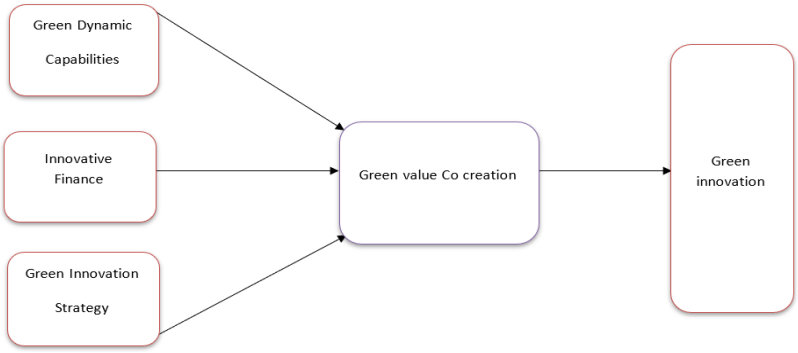

Figure 1. Research Model

Source: Literature Review and Current Research

Methodology

The current research has adopted a quantitative method for data collection. However, the quantitative data collection technique has used surveys through which a defined number of questionnaires were distributed among the target population of the research. The paper analyzes independent, dependent, and mediating variables in the research. The variables are independent: green dynamic capabilities, innovative finance, and green innovation strategy, dependent variable: green innovation, and mediating variable: green value co-creation. The targeted population for the research is the teachers of different universities from whom the data will be collected. The target country for the research will be China.

Research Population and Sampling Method

The study is based on the quantitative data collection technique so a survey will be conducted. The research has used questionnaires that the target population will fulfil. The target country is defined to be China. In addition, the target population will be the teachers of various universities located in China. The concerned sector of the study is the education sector. Moreover, the research examines the green dynamic capabilities, innovative finance, and green innovation strategy. The study discovers the relationship among each variable along with the mediating role of green value co-creation with each variable. This study used random sampling technique for data collection. The target population has been obtained from the education sector of China. The teachers who are teaching in universities in China were asked to fill out the questionnaires. A total of 350 questionnaires were distributed among the teachers of Chinese universities. 330 out of 350 questionnaires were received, which were helpful in the interpretation of data. The gap in the number of questionnaires was already considered, so it does not impact the accuracy of the results. The recovery rate of questionnaires is 94 percent which helps attain accurate results.

Measurement Items

The research variables are analyzed with the help of measurement scales of different scholars. Each independent, dependent, and mediator variable has a measurement scale based on a definite number of items. These items are different for each variable, i.e., green dynamic capabilities, innovative finance, green innovation strategy, green innovation, and green value co-creation. The data obtained through the items are then investigated with the help of the Likert scale, which is based on five points varying from number 1 to number 5. 1 is the least number, and number 5 is the highest rank on the questionnaire. Table 1 of the research is explaining the measurement items sources.

Table 1

Measurement of Items

Variables	No. of items	References
Green dynamic capability	5	(Y.-S. Chen & Chang, 2013)
Innovative finance	5	(Pu et al., 2021)
Green innovation strategy	4	(Y. Sun & Sun, 2021)
Green innovation	4	(W. Song & Yu, 2018)
Green value co-creation	3	(Yousaf, 2021)

Data Collection and Analysis

The study used a questionnaire technique for data collection and analysis. The questionnaires comprise two sections. The first section defines the demographic characteristics of the respondents, for instance, gender, age, etc. The second part is based on a detailed analysis of the study's variables. In the second part, each variable is defined with the number of items adopted from different scholars. The measurement scale for each variable consisted of items that helped develop questions for the respondents to answer. Each variable, i.e., independent: green dynamic capabilities, innovative finance, green innovation strategy, dependent variable: green innovation, and mediating variable: green value co-creation, has its number of items.

Furthermore, the data collected through questionnaires is run through AMOS. AMOS helps interpret data, which in turn draws the study's results. The data analysis is based on a two-way approach. Firstly a model is drawn in which the theoretical framework is defined. The hypotheses are generated with the help of the structural model. These hypotheses show three linear relationships between green dynamic capabilities, innovative finance, green innovation strategy, and green innovation.

Similarly, a mediating role of green value co-creation in the relationship between green dynamic capabilities, innovative finance, green innovation strategy, and green innovation is also observed. On the other hand, a measurement model defines the variables along with some items. The items helped collect data, which is then run into AMOS to test the validity of the hypothetical relationships described in the paper. The study has used confirmatory factor analysis and structural equation model for data analysis and findings. These tests are widely used in the studies of social sciences for validity and reliability of data and hypotheses findings.

Ethical Consideration

The study has followed some ethics and rules while conducting the research. Firstly, the data collection method has been ensured to be free from all biases. The results which are obtained in research are conveyed without any interference from personal or professional interests. Secondly, the work of each author and scholar is recognized in the paper. The researcher highly appreciates every single contribution. Thirdly, the privacy of each contributor is held with responsible. For instance, the scales adopted for

measurement of the variables are asked for permission before their practical use.

Moreover, the respondents are also asked for permission before distributing questionnaires. Lastly, the legality of the research is also ensured with the assurance of China's government and education sector. Thus, the paper has provided due respect to all the living and non-living contributors to research.

Findings

Respondent's Demographics

The data has been collected from the teachers of different universities in China. The questionnaires were distributed to the teachers, and their response in return to those questionnaires was appreciable. Among 350 distributed questionnaires, the complete received questionnaires were 330. Then these 330 questionnaires were further analyzed to draw results for this study. The fluctuation was observed among these questionnaires in terms of gender, education, the experience of teachers, and their age.

Table2

Demographic Characteristics of Respondents

		N	%
Gender	Male	178	52.2%
	Female	152	47.8%
	Graduation	42	12.0%
Education	Post-Graduation	132	43.4%
	Masters	126	33.2%
	Others	30	11.4%
Age	21-30	175	24.4%
	31-40	104	29.4%
	41-50	32	30.7%
	50+	19	15.5%
Experience	4-7 years	121	54.1%
	8- 10 years	161	36.1%
	more than 10 years	30	9.8%

Table 2 explains that from the demographics, it was observed that 178 respondents were male and 152 among the total 330 were female with a frequency percentage of 52.2 % and 47.8% respectively. The education of the teachers was also different as China's universities seemed to prefer hiring the most qualified and experienced teachers because graduated teachers were 42, 132 were post-graduated, 126 were having their master's degrees, and 30 from other associated degree programs, with a percentage of 12.0 %, 43.4 %, 33.2 %, and 11.4 % respectively. The age of respondents also varied as 175 respondents fall into the age category of 21-30, 104 teachers were senior in the age group of 31–40, 32 teachers were in the age group of 41–50 and 19 teachers were from above 50 years. 161 teachers had experience between 8–10 years, 121 had the experience of 4–7 years and 30 teachers had the experience of more than 10 years.

Descriptive of Studied Variables

Descriptive statistics are used to explain and summarize the characteristics of a study. There are some important indicators in the description of studied variables that have to be reported which describes the normality of the data.

Table 3

Descriptive of Studied Variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
GDC	330	1.00	5.00	3.3503	1.02442	-.313	.134
IF	330	1.00	5.00	3.3630	1.00126	-.354	.134
GIS	330	1.00	5.00	3.2538	.93713	-.365	.134
GI	330	1.00	5.00	3.3947	.93850	-.391	.134
GVC	330	1.00	5.00	3.5505	.95931	-.583	.134
Valid N (listwise)	330						

The mean, standard deviation, and skewness are the indicators that confirm the non-existence of any outlier in the data. Table 3 explains the summary statistics for the variables of the model. The minimum and maximum values of the construct explain that there were no outliers in the data, as the value range assumes the threshold imitated by the scales of measures. The mean values range between 3.2–3.5 indicating a design of agreeableness among the respondents. Moreover, the values of normality as illustrated by the skewness test resulted in between -1+1, thus explaining that all the constructs were distributed normally.

Reliability and Validity Tests

A series of tests are involved in reliability and validity testing, incorporating the KMO and Bartlett test, the factor loading, and the validity test through the convergent validity. Table 4 illustrates the results of the KMO and Bartlett tests. This test was the first step in the reliability and validity testing, the purpose behind this test was to ascertain the sample adequacy and sufficiency. The adequacy of the sample was estimated corresponding to the variables selected for the study. The KMO test thus confirms the adequateness of the

sample and indicates whether the rotated component matrix gained through the factor loading would yield adequate results (Joseph & Cashin, 2021b). The Bartlett test is an additional test implied to measure the associated strength among different variables. Table 4 explains that the KMO test holds a value of .887, therefore guarantees the sample accuracy according to the number of variables selected for the study. The Bartlett test is also exhibiting that the association of variables would be significant. This result explains that later the factor analysis will yield significant results.

Table 4

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.887
Bartlett's Test of Sphericity	Approx. Chi-Square	8028.541
	df	210
	Sig.	.000

Factor analysis is the next step in the process of testing reliability and validity. Table 5 explains the results of factor loadings for the measurement model. The loading values of all the variables gained through factor loadings explain that all the variables observed have loadings between 0.5–0.8 which is prominently greater than the threshold limit of 0.5. These results explain that the variables were loaded successfully and the strong interrelations among the variables. There is no cross-loading or duplication issue observed among the values. The results of factor analysis were thus reported to be significant.

Table 5

Rotated Component Matrix

	Component				
	1	**2**	**3**	**4**	**5**
GDC1	.708				
GDC2	.599				
GDC3	.407				
GDC4	.405				
GDC5	.713				
IF1					.804
IF2					.785
IF3					.806
IF4					.807
IF5					.514
GIS1			.828		
GIS2			.788		
GIS3			.774		
GIS4			.813		
GI1				.760	
GI2				.711	
GI3				.878	
GI4				.828	
GVC1		.870			
GVC2		.866			
GVC3		.479			

The next test is the validity test series, which was the evaluation of the construct validity of the measurement model. The composite reliability and average variance extracted were adopted to identify the internal consistency of the variables with the help of convergent validity. The CR values range above the threshold range of 0.7 indicated in table 6. Similarly, the values obtained for the AVE range above the defined threshold range of 0.5 cut-off value. These values indicate that there is internal consistency among the variables and therefore reliable

Table 6

Discriminant and Convergent Validity

	CR	**AVE**	**MSV**	**GDC**	**IF**	**GIS**	**GVC**	**GI**
GDC	0.913	0.695	0.379	**0.873**				
IF	0.928	0.750	0.352	0.884	**0.812**			
GIS	0.910	0.813	0.398	0.601	0.583	**0.958**		
GVC	0.841	0.644	0.372	0.585	0.639	0.459	**0.808**	
GI	0.803	0.640	0.431	0.566	0.091	0.456	0.742	**0.872**

The discriminant validity is yet another indicator to measure the reliability of the results. It referred to the distinctness among variables, such as the variables that are not theoretically correlated and are resulted not related to each other. The value of discriminant validity is depicted in bold and exhibits that all the variables are distinct from each other. Therefore, the measurement model has discriminant validity present as illustrated in table 6. Since all the tests of validity and reliability provided significant results, it is clear that the concerned sample size was adequate, the inter-

relations among variables are significant along with the confirmed reliability and validity of the constructs.

The Model Fitness

The model fitness is evaluated with the help of the evaluation of various fitness indices. The research thus computed the CMIN/df, GFI, CFI, IFI, and RMSEA. Table 7 explains the threshold and observed values for each index. It can be concluded that the measurement model is fit as all of the indices computed values correspond to the limit of the threshold. Thus, the measurement model has resulted to be fit and it has been assumed that the structural equation modeling results would be effective too. The visual description of confirmatory factor analysis is presented in Figure 2.

Table 7

Confirmatory Analysis

CFA Indicators	CMIN/DF	GFI	IFI	CFI	RMSEA
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08
Observed Value	1.459	0.812	0.948	0.978	0.067

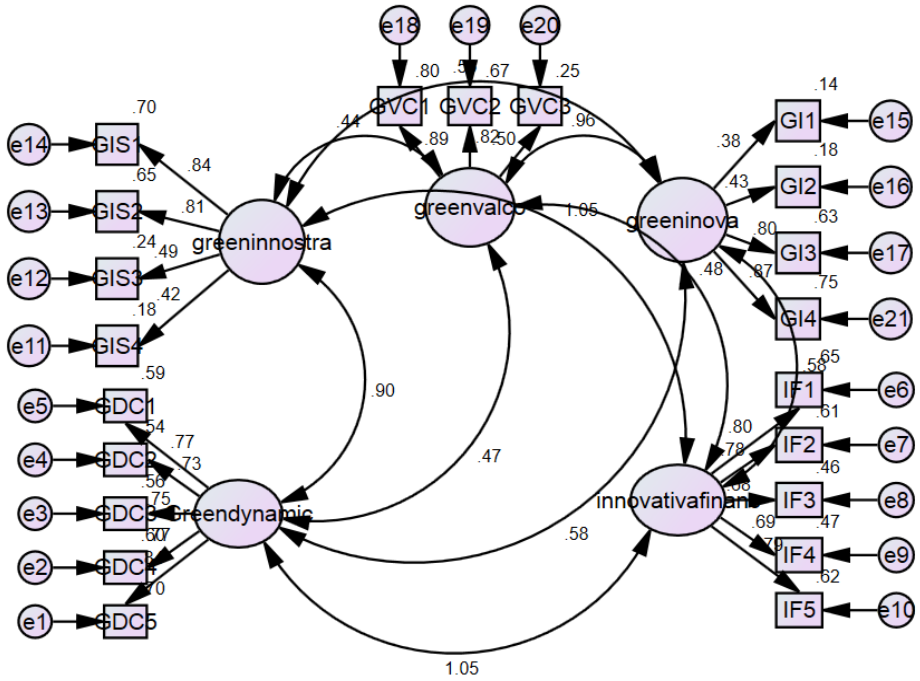

Figure 2. CFA

Hypothesis Testing

The study hypothesized that there is a positive and significant relationship between green dynamic capabilities, innovative finance, green innovation strategy, and green innovation in the educational institutes of China. Table 8 shows that all the linear hypotheses are significant and accepted, as the probability value for the first hypothesis is .011. Similarly, for H2, a unit change in GDC will increase the GI of Chinese education institutions by .223 %. A unit change in GIS will increase the GI by .241 %. The p-value for H2 and H3 are .020 and .001 respectively.

Table 8

Structural Equation Modeling

Effects	Hypothesized Path	B	S.E	P value	Conclusion
Linear Effects					
Hypothesis 1 (+)	GDC → GI	.167	.189	.011	Accepted
Hypothesis 2 (+)	IF→ GI	.162	.223	.020	Accepted
Hypothesis 3 (+)	GIS→ GI	.161	.241	.001	Accepted
Mediation Effects					
Hypothesis 4 (+)	GDC → GVC→ GI	.245	.040	.015	Accepted
Hypothesis 5 (+)	IF →GVC→ GI	.261	.043	.004	Accepted
Hypothesis 6 (+)	GIS →GVC→ GI	.266	.041	.002	Accepted

The green value of creation has been considered and studied as a mediator in this research. Table 8 also indicates that the H4, H5, and H6 exhibit the probability values of .015, .004, and .002 respectively, thus the mediation in hypotheses 4, 5, and 6 have been accepted and explained by table 8. It can be concluded that the green value of co-creation can strongly mediate the relationship between green dynamic capabilities, innovative finance, green innovation strategy, and green innovation respectively in the educational institutes of China. The results of structural equation model are described in Figure 3.

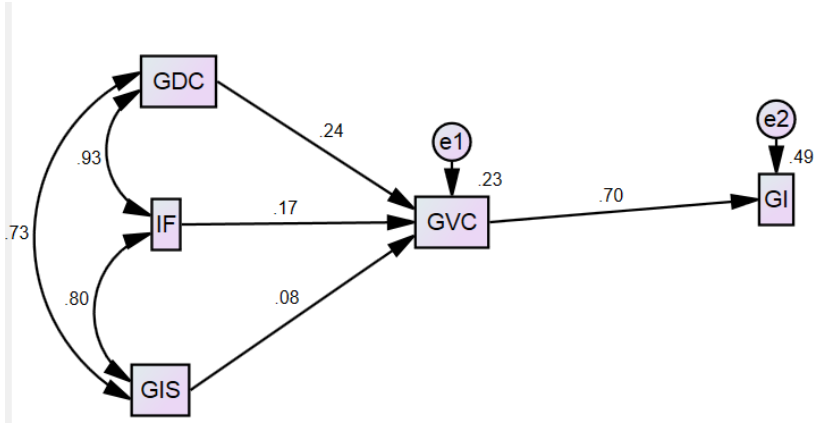

Figure 3. SEM

Discussion

The rapid increase in technology has created several problems in the productivity and sustainability of organizations. However, the stakeholders have adopted green processes to overcome these issues. Green innovation is one of the solutions to such problems. The paper has analyzed green innovation with the help of some factors that influence the green innovation process. These factors include green dynamic capability, innovative finance, and green innovation strategy. The paper also discusses the mediation role of green value co-creation. These variables are observed in the education sector of China by analyzing the university teachers. There are six hypotheses that the research has developed. Three of the six hypotheses are linear, showing direct impact as; Green dynamic capabilities have a significant impact on Green innovation, Innovative finance has a significant impact on green innovation, and Green innovation strategy has a significant impact on Green Innovation. The remaining three are the mediation role of green value co-creation, these are; Green value co-creation has a mediating impact on the relation between Green dynamic capabilities and Green innovation, Green value co-creation has a mediating impact on the relation between Innovative finance and Green innovation, and Green value co-creation has a mediating impact on the relation between green innovation strategy and Green innovation. Organizations have different capabilities which they develop as a critical mechanism to transfer their skills and knowledge for efficiency and effective functioning. These capabilities are known as dynamic capabilities. Moreover, green dynamic capabilities are linked with green innovation; thus, green dynamic capabilities significantly impact green innovation (Singh *et al.,* 2022).

Indeed, technology is necessary, but the green innovation is more critical for the sustainability of the environment (Suherlan, 2017). The role of government is to make the organizations of public and private sector obligatory to adopt all the values of green innovation (Fitriani *et al.*, 2020). Furthermore, the organizational management is required to take appropriate actions that are critically important and necessary to a greater extend for sustainability of the educational sector working (Garvey *et al.*, 2021). Similarly, by adopting the innovative working, the organization can develop a way to the green sustainability (Sarisky, 2021).

Similarly, to validate that Innovative finance significantly impacts green innovation, organizations' financial resources directly influence the innovation process in firms. A country's financial resources impact the decisions to initiate the organization's innovation process (Yu *et al.,* 2021). To enhance the productivity and performance of firms, organizations are likely to adopt green innovation strategies that help enhance the process of green innovation. Furthermore, the use of resources is also ensured with the help of green innovation strategies. Hence, the Green innovation strategy significantly impacts Green innovation (W. Song & Yu, 2018). Different studies examine the mediation impact of green value co-creation. Firstly, green value co-creation mediates the relationship between green dynamic capabilities and green innovation because the green dynamic capabilities, i.e., eco-design, promotion, supply, etc., result in developing green value co-creation among the consumers, which leads to the process of green innovation (Yahya, Khan, Farooq, & Irfan, 2022). In addition, utilizing eco-friendly production strategies creates value among consumers, ending with an innovative green process. Therefore, Green value co-creation has a mediating impact on the relation between green innovation strategy and Green innovation (Huidong Sun *et al.,* 2020). In contrast, innovative finance is related to better production, which helps to reduce the negative impacts on the environment. This creates a value among customers, known as green value co-creation contributing to green innovation. Hence, Green value co-creation has a mediating impact on the relation between Innovative finance and Green innovation (Yousaf, 2021).

Conclusion

The current study has attempted to add knowledge to the process of green innovation. It provides essential information regarding the topic. The changing world pattern has introduced newly developed methods for the sustainability and productivity of different sectors. The paper aims to find the relationship between the factors, i.e., green dynamic capability, innovative finance, and green innovation strategy affecting the process of green innovation. The study has focused on the education sector in China. The teachers of Chinese universities have played a significant role in interpreting the relationship among the

variables of the paper. There were some linear and mediating relationships of the variables, e.g., Green dynamic capabilities have a significant impact on Green innovation, Innovative finance has a significant impact on green innovation, and Green innovation strategy has a significant impact on Green Innovation. Green value co-creation has a mediating impact on the relation between Green dynamic capabilities and Green innovation, and Green value co-creation has a mediating impact on the relation between Innovative finance and Green innovation. Green value co-creation has a mediating impact on the relation between green innovation strategy and Green innovation. All these relationships have been found to have a significant impact. Therefore, the study has provided information regarding green innovation, which can be helpful for firms to increase productivity and sustainability without affecting the environment.

The study provides a wide range of knowledge regarding green innovation. The paper aims to define green innovation with the effect of green dynamic capabilities, green finance, and innovative green strategy. All these factors are concerned with the preservation of the environment from harm. The body of knowledge has been expanded through the paper. It also helped in creating awareness among organizations as well as the readers. The teachers were asked to analyze the subject, which adds information for managers and the stakeholders of different organizations. This can help the education sector to adopt such practices as defined in the paper. It may also contribute to helping the policymakers to develop policies that are related to green innovation. Furthermore, the paper explores the green financial aspect for organizations. Introducing green finance and adopting such a process can help every sector, not only the education sector, improve resource use. Besides, the study has also explained the planned behaviour theory, which helps organizations be aware of green behaviour. The study promotes green innovation with different variables. Thus, the present paper increases the body of knowledge and creates awareness among individuals regarding green innovation.

The study provides theoretical as well as practical implications of green innovation. The firms can adopt the relationships defined in the paper to develop the process of green innovation with the help of green dynamic capabilities, green finance and innovative green strategy, and green value co-creation. Each study variable can be practised in every sector, including education, to promote and sustain green innovation. The paper provides green strategies, capabilities, and finances. All these are the main aspects of organizational performance. Thus, the practicality of the paper can be ensured by adopting these practices, which are based on green innovation.

Along with a wide range of applicability, the study also has some limitations. The research variables are limited, i.e., green dynamic capabilities, green finance, innovative green strategy, and green value co-creation. This can be expanded by adding more factors that affect green innovation. Moreover, the study's sector is confined to China's education sector, which means the study applies to countries similar to China and, more specifically, the education sector of those countries only. In addition, the study is quantitative-based research which future researchers can expand by exploring the qualitative techniques to study the process of green innovation.

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