Enhancing Green Customer Loyalty through Green Banking Initiatives: The Mediating Effect of Green Customer Satisfaction and Customer Co-Creation

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Enhancing Green Customer Loyalty through Green Banking Initiatives: The Mediating Effect of Green Customer Satisfaction and Customer Co-Creation

Dr. Ahmed Mostafa Rady; Dr. Ahmed Yehia Ebeid and Dr. Mohamed Mahmoud Fawzy

Abstract

In an ever more sustainable green environment, Consumer pressure on companies to adopt green practices is growing. The demand for a more sustainable and green society has made banks more oriented to green banking practices, to attain a competitive advantage, and ultimately enhance green customer loyalty. While some of the following research variables have been highlighted in past research, the linkage between the following study variables hasn't been investigated in the existing literature. Hence The current research seeks to address the gap in current knowledge by analyzing the critical role of Egyptian banks in cultivating customer loyalty for sustainable green banking practices. Furthermore, it explores how customer co-creation, facilitated through effective communication and interaction with customers, can enhance customer satisfaction and promote the adoption of environmentally friendly banking behaviors, ultimately contributing to a more sustainable green environment. Moreover, the study uses a convenient sampling method, the data were collected conventionally from 301 banking customers in Egypt. Structural Equation Modeling (SEM) was used to test hypothesized relationships. The results supported all the hypothesized direct relationships in the conceptual model, moreover, the result showed a partial mediation effect in the indirect path of green customer satisfaction and customer co-creation in the relationship between green banking initiatives and green customer loyalty.

Keywords: Green Customer Loyalty, Green Banking Initiatives, Green Customer Satisfaction and Customer Co-Creation.

1- INTRODUCTION

Recently, the global banking industry has increasingly recognized the importance of sustainability and environmentally responsible practices. This shift has led to the development of green banking initiatives aimed at lowering the environmental footprint of banking operations and promoting sustainable development. The role of innovation in enhancing green sustainability is one of the major aspects covered in the subject of sustainable development, which is expanding quickly in the financial services sector (Varga, 2018). Researchers and policymakers in the financial and banking industries are paying increasing attention to sustainable development in the financial services sector, and its effect on the environmental, ethical, and social aspects of the economic system (Castilla-Rubio, et al 2016).

Green banking GB is a developing strategy that aims to tackle sustainable environmental challenges through banking operations to encourage green economic growth within the banking industry. It includes activities that consume fewer resources, produce less waste, and reduce carbon dioxide (Pawar & Munuswamy 2022). Accordingly, green banking can be lustrated as a type of bank lowering overall carbon emissions and enhancing sustainable performance, in green and ecologically friendly places. (Zhang, et al 2022). Green banking initiates GBI refers to any banking activities, that promote environment-friendly practices and the reduction of carbon dioxide emissions, Such as paperless operations and technology-based services (Hebbar & Mahale 2020). it is known as sustainable banking, socially responsible banking, and environmental banking. (Akter, et al., 2018; and Khairunnessa, et al., 2021). Conversely, promoting customers to adapt to a new product and service requires coordination and communication with the customer, to build a social, adaptable, and effective approach that seeks to develop useful new goods and services, and this can be pointed out as customer Co-Creation CC (Luu, 2019). According to Nysveen and Pedersen (2014, p. 811), customer co-creation is defined as the "degree to which consumers actively participate with organizations in improving existing solutions or find new solutions to create more value both for the consumer and the organization."

Customers nowadays are more oriented towards environment-friendly practices, So banks must recognize the importance of green banking activities and apply new green practices to society from one side, and involve the customer in the co-creation process from another, it is almost certain that however banks are launching more and more green banking activities, their success depends on the broad acceptance and contentment of the customers' satisfaction with the green products and services these banks provide, as well as their general preference and awareness of the concepts of green banking. (Lindgreen 2006). The term green consumer satisfaction is used to describe the result of consumption when a product or service meets or exceeds the green expectations of society, the needs of the consumer market, and the requirements of environmental laws (Herath & Herath 2022). In other words, it is the level of product and service consumption that meets customers' environmental, sustainable, and green desire expectations. In the same vein, customer satisfaction will ultimately lead to consumer loyalty which represents an advantage for business activities such as repeated numbers of transactions, sales opportunities, positive word of mouth, and the continuity of loyal customers to use financial services (Sun, et al 2020). Green customer loyalty refers to a consumer's commitment to repeatedly repurchase a chosen product in the future and desire to retain a relationship with a company that is concerned with the environment or going green. (Herath & Herath 2022).

Accordingly, the following study attempts to bridge the research gap by highlighting the essential role of Egyptian banks, in ultimately enhancing customer loyalty for more sustainable green banking initiatives, and by communicating and interacting with their customer (customer co-creation) to reach customer satisfaction and promote the concept of sustainable green environment through increasing green banking practice. Hence, the study will clarify the following four objectives: First, assessing the direct relationship between (GB initiatives, green customer loyalty, customer co-creation, and green customer satisfaction), in the Egyptian banking industries. Second, analyze the mediating effect of green customer satisfaction and customer co-creation in the direct relationship between the aforementioned variables. Third, identify the major challenges and benefits of GB in the banking industries in Egypt.

2- LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The following study underlies a set of different theories that support the study variables. first, Unified Services Theory (UST), by Sampson & Froehle, (2006) which focuses on comprehending the function of the customer in the management of production and operations. In other words, UST is that "within service processes, the customer provides significant inputs into the production process" (Sampson & Froehle, 2006, p. 331). Accordingly, it is important to involve the customer in the co-creation process in the organization, to comprehend customer satisfaction and ultimately enhance customer loyalty. Second, is social identity theory, which illustrates the effect of social and environmental responsibility on customer behavior. And their insistence on the enhancement of a green sustainable environment (Tajfel, H. 1978). As mentioned above, going green has become an important aspect of the global banking industry. And understanding the customer demand on the green banking initiatives is crucial for banks to recognize, whether these green initiatives succeed or fail based on the level of their customer satisfaction. Accordingly, it is important to shed light on linking the following variables in the study model. Moreover, the social identity theory, argues that customer citizenship behavior results from the increased social connection between a corporation and its customers (Dutton et al 1994). Thus, once the customer identifies his corporation, the process of customer co-creation in designing the company products or services will be important in the enhancement of customer satisfaction and loyalty for the organization.

2.1. Green banking initiatives and customer co-creation

Implementing sustainable green policies and practices in the banking sector will support economic sustainability in the environment and effectively strengthen the shift to a greener economy. (Hoque et al. 2019). On the other hand, Co-Creation CC is viewed as a value creation technique through cooperation between a firm and its customers. Aiming to gratify clients, gain their trust, and uphold enduring ties with them (Mainardes, et al 2017). In the banking industry, CC refers to the extent to which customers cooperate with businesses to improve current solutions or create new ones that are beneficial to both the client and the bank. (Iglesias et al 2020). Therefore, the banking sector needs to promote green banking practices by involving bank customers in the CC process. Following the above-mentioned premises, we hypothesize that:

H1: Green banking initiatives have a significant effect on customer co-creation

2.2. Customer co-creation and green customer loyalty

Participating in co-creation activities gives customers the chance to grow personally and gives them access to social and interact in aspects that make them feel connected to the company and loyal to the brand (Park & Ha 2016). Co-creating green products and services through customer communication and interaction can significantly boost green customer satisfaction, fostering loyalty. This process helps banks align with customer value, creating sustainable and loyal relationships with their clients. (Singh, et al 2012). A loyal customer represents a source of profit to the business, due to the number of repeated transactions, referral to the brand, and willingness to purchase at a high price (Lovelock & Wirtz 2004). According to Raza, et al (2020). In his research applied to 280 banking customers in Pakistan have found a significant relation between CC and customer loyalty. Also, Hosseini & Hosseini (2013) and Nysveen & Pedersen (2014). Have found a appositive relationship between CC on customer loyalty in the banking industry. In the same vein, Kaufmann, et al (2016). Have argued that loyalty to the customer increases with the increase of the co-creation engagement in the brand activities. Moreover, the study by Hajli et al (2017), on Banking services, has found a positive influence on customer co-creation with customer loyalty, as it enhances and increases customer trust in the brand, and finally Polo Pena et al (2014). Have observed that the commitment of the CC process enhances customer loyalty in the tourism sector. Following the above findings, we hypothesize that:

H2 Customer co-creation has a significant effect on green customer loyalty.

2.3. Green banking initiatives and green customer satisfaction

Within the global banking sector, becoming green has grown to be a popular trend. To reduce their negative environmental impact as good corporate citizens for sustainable development, banking institutions have been inspired to provide paperless, technology-driven services and environmentally friendly products and services. However, Banks must recognize the demand side of green initiatives because the satisfaction of their customers determines whether such investments succeed or fail in the end (Herath & Herath 2019). The secret behind establishing an everlasting relationship with the company is customer satisfaction. So, firms need to build more distinctive relationships with their clients in the current

competitive environment (Lindgreen 2006). "Green customer satisfaction" refers to the outcome of consumption when a good or service satisfies the societal standards for greenness, consumer market demands, and environmental legal requirements (Herath & Herath 2022). Therefore, banks that have incorporated green practices, green ideas, and green products and services may meet their consumers' expectations in terms of the environment and raise green customer satisfaction. Different studies have highlighted the impact of GBI and green satisfaction. According to the studies of Herath & Herath (2022), on the Impact of GBI on Customer Satisfaction in the public sector commercial banks in Sri Lanka, have found a significant impact between GBI and green customer satisfaction, Hossain, et al., (2015) in their study on the private banks' customers, have found enhancement of the customers' satisfaction with the green banking initiative through the usage of e-banking services. Moreover, Agarwal, (2009) has found a positive impact of technology-driven banking services and overall customer satisfaction. in contrast, Martins, et al., (2014) have found that many customers are more satisfied with traditional banking services than using the new technology in the banking services. Other scholars have argued that customer satisfaction level is only neutral toward the usages of e-banking services (Mary 2015). Hence, following the above findings from multiple settings, we hypothesize that:

H3: Green banking initiatives have a significant effect on green customer satisfaction

2.4. Green customer satisfaction and green customer loyalty

Customer satisfaction is crucial for organizations, especially those in the service business sectors, but it may also be difficult to achieve. The importance of Customer satisfaction comes from the enhancement of the customer's long-life relation with the organization, which promotes customer loyalty for a specific business (Iglesias, et al., 2020) Additionally, businesses must recognize the value of customer satisfaction because keeping current customers costs less than acquiring new ones. Therefore, acquiring customer satisfaction in the banking sector is regarded as a key component of effective customer loyalty management (Raza, et al., 2020).

Effective loyalty is based on quality satisfaction, loyalty is the result of satisfaction, which in turn has a significant effect on loyalty (Spiteri and Dion, 2004). According to a prior study, there is a positive association between satisfaction and loyalty, Oliver, (1999), has underlined that customer satisfaction is a crucial factor in determining whether a customer will remain loyal. Also, Bowen and Chen, (2001) have found a positive correlation between customer satisfaction and customer loyalty. Moreover, Spiteri and Dion, (2004), have found a positive relationship between customer satisfaction and customer loyalty, accordingly, the satisfaction of the customer green perspective will enhance the loyalty of the same customer from the green perspective way. Therefore, the research will propose the following hypotheses.

H4 Green Customer satisfaction has a significant effect on green customer loyalty

2.5 Green banking initiatives and green customer loyalty

One of the most important factors influencing green consumer loyalty in the banking sector is promoting green practices in the services provided. This is due to the sense of stewardship that modern customers have for the environment. And their insistence on the enhancement of a green sustainable environment. The numerous marketing advantages that follow from higher interaction between the customer and the green banking practices are evidence of the value of customer loyalty from the green perspective (Sun, et al., 2020). When choosing a bank, customers and investors don't just look at the security of their money; they also examine the possibility that their money will be utilized to benefit the environment and societal living standards. Customers now place more emphasis on banks that are more accountable and concerned with protecting the environment (Muhamat & Nizam 2010). Following previous study results, a positive relationship has been investigated in the relationship between GBI and green customer loyalty (Binder and Blankenberg 2017). A positive correlation between green banking initiatives and green customer loyalty has been found. Similarly, Chen, Y. S. (2010) discovered a significant effect between green value and customer loyalty. Furthermore, in their investigation of consumers in North Cyprus' retail banking industry, Ibe-enwo et al. (2019) found a direct and noteworthy impact of GB practices on bank loyalty. accordingly, we propose the following hypotheses:

H5 Green banking initiatives have a significant effect on green customer loyalty

2.6 Customer Co-creation and Green Customer Satisfaction

In many business industries, customer participation has long been a major factor, in the promotion of customer satisfaction. The co-creation process is viewed as a method for creating value through a process of collaboration between a business and its clients. To satisfy consumers and gain their trust (Mainardes et al., 2017). Contributing to the CC process inspires people in various ways. First, customers can develop close, personal relationships with other members of the collaborative community. Additionally, customers who take part in a business' co-creation process, feel as though they are growing individually, learning, and contributing to the community (Chen et al., 2017). Different scholars have investigated the impact of CC and overall customer satisfaction such as Grissemann and Stokburger (2012) who found a positive relationship in their research on customer satisfaction and CC performance in the terrorism industry. Also, Opata et al., (2021), have explored a significant effect between CC and customer satisfaction in their study on automobile customers in Ghana. Moreover, other scholars have found that customer engagement in organization green practices enhances customer satisfaction (Bordian et al., 2022). Therefore, following the above findings, we hypothesize that:

H6: Customer Co-creation has a significant effect on green customer satisfaction

2.7 The Mediating role of customer co-creation

The importance of the environmentalism concept in business has made the customer more enhanced to the sustainable business practices and friendly products and services. but surprisingly, this hasn't been the case in the commercial business performance of sustainable green products. (Grebmer & Diefenbach 2020) However, there is a discrepancy between what customers anticipate from businesses and how those businesses interact with those customers (Popovic et al., 2020). And this can be pointed out as the CC gap. (CC) is a social, adaptable, and effective process that seeks to develop useful new products and services by collaborating and communicating with customers (Raza et al., 2020). The concept of value CC is viewed as a strategy for value development through a process of collaboration between an organization and its customers. As Banking customers become more informed, educated, and involved in a variety of brand awareness offered by various banks, banking institutions are working to satisfy consumers, earn their trust, and uphold lasting relationships with them (Mainardes, et al 2017).

In banking, loyalty refers to customers' commitment to a specific bank, avoiding competitors. (Cambra et al., 2017). The co-creation process between the bank and its customers may ultimately encourage and lead to customer loyalty, representing an unshakeable cornerstone of business philosophy (Osakwe & Yusuf 2021). Accordingly, it can be proposed that the CC process has a significant influence on customer loyalty, and this is aligned with past research such, (Kaufmann et al., 2017; & Hajli, et al 2017). In banking, co-creation is the extent to which clients work with the bank to enhance current solutions or create new ones that benefit both the client and the bank. (Iglesias, et al., 2020) Though, the interactional nature of customer co-creation in developing new products and services in the banking industry will be enhanced in this research by proposing the mediation effect of CC, between green GBI and green customer loyalty. Accordingly, we suggest the following hypotheses.

H7: Customer CC mediates the relationship between green banking initiatives and Green consumer loyalty.

2.8 The Mediating role of green customer satisfaction

The global orientation towards a green financial industry has become very essential nowadays since the idea of GB has inspired banking organizations to provide technology-driven services with minimal environmental impact and to fulfill their responsibility as corporate citizens on sustainable development. However, understanding the demand side of green banking practices is crucial for banks to recognize, since it will determine whether these investments ultimately succeed or fail based on the level of satisfaction of their ultimate customer (Herath & Herath 2019).

green satisfaction is defined as “a pleasure level of consumption-related fulfillment to satisfy customers’ environmental desires, sustainable expectations, and green needs”. (Martínez 2015, p. 902) Science green banking is a growing strategy that aims to address long-term environmental problems through bank operations to support green economic expansion in the banking industry. As mentioned earlier, effective loyalty is based on the perceived quality of customer satisfaction. and that loyalty is the result of satisfaction. (Spiteri and Dion, 2004). Accordingly, we propose the following hypotheses.

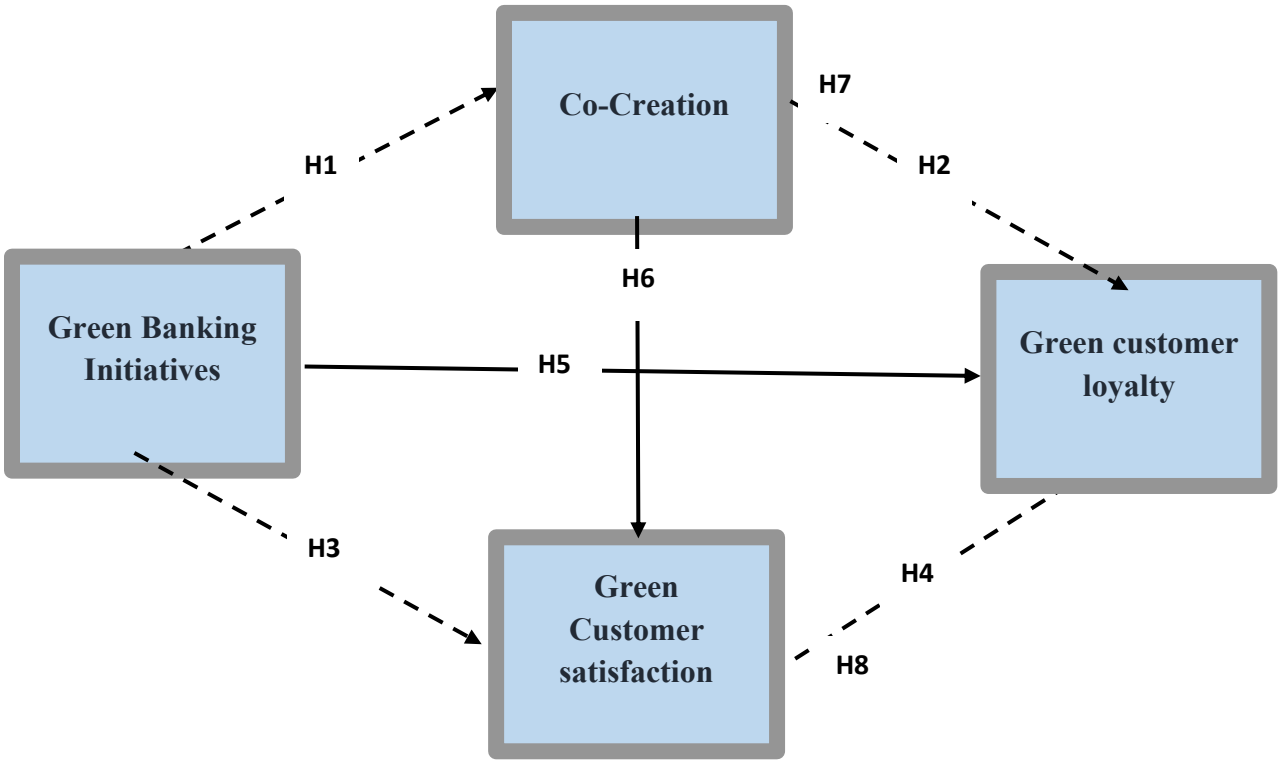
H8: Green customer satisfaction mediates the relationship between green banking initiatives and green consumer loyalty.

Research Methodology

3-1 The Conceptual Framework of the Study

The conceptual model of the research underlies a set of different theories that support the study variables. First, the Unified Services Theory (UST), by Sampson & Froehle, (2006) focuses on comprehending the function of the customer in the management of production and operations. As it emphasizes the importance of customer involvement in the co-creation process in the organization. Secondly, social identity theory, which illustrates the effect of social and environmental responsibility on customer behavior. (Tajfel, H. 1978). accordingly, the following study will make a theoretical contribution by identifying the relationship between the different variables in the study model in the Egyptian banking industry. see Fig.1

The conceptual model is shown in **Fig. 1**.



3- Research Design

The following research design, focused on quantitative and descriptive research, to test the hypotheses and to determine and establish the relationship between the different variables in the study model. The research has relied on a single cross-sectional data collection according to the homogeneity of the phenomena among the sample unit. Accordingly, a structured questionnaire was designed to demonstrate the different relationships between the dependent and independent variables shown above in the conceptual model.

4.1 Questionnaire Design & measurement scales used

The questionnaire consists of two sections. The first section includes the demographic details of respondents. The second section was designed using questions adapted from previous authors and modified to suit the purpose of this study. Also, it was developed in English and Arabic languages based on the information required above that was developed to test the hypotheses. The questionnaire contains four dependent and independent variable constructs: Green Banking Initiatives (GBI) were adapted from Khan, et al. (2014), and it contains (four items), the items for co-creation (CC) were adapted from Nysveen and Pedersen (2014), and it contains (four items). Moreover, the scale of Green consumer loyalty (GL) was adapted from Oliver (1999), and it contains (four items). And finally, Green Customer Satisfaction (GS) was adapted from Wang, J., et al. (2018) and it contains (three items). In total, there were 15 question statements. A five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5), is used to score the question statements. as shown in **Table 1.**

4.2 Measurements

Table (1): Measures of study variables

Measurement	Items	Question statements
Green Banking Initiatives (GBI)	GBI1	My bank's (environmental) functions provide very good value for me.
	GBI2	My bank is very concerned about environmental sustainability.
	GBI3	My bank management is serious about green banking projects and willing to finance green projects.
	GBI4	My daily operations at our bank are safe for the environment.
Green Customer Loyalty (GL)	GL1	I am happy about my decision to choose this product (bank) because of its (environmental) functions.
	GL2	I believe that I do the right thing to purchase this product (bank) because of its (environmental) performance.
	GL3	Overall, I am glad to buy this product (bank) because it is (environmentally) friendly.
	GL4	Overall, I am satisfied with this product (bank) because of its (environmental) concern.
Co-creation (CC)	CC1	I often express my personal needs to this brand (bank).
	CC2	I often find solutions to my problems together with my brand (bank).
	CC3	I am actively involved when the brand (bank) develops new solutions for me.
	CC4	The brand (bank) encourages customers to create new solutions together.
Green Customer Satisfaction (GS)	GS1	In general, I am happy with the decision to select Ecological Bank due to its environmental image
	GS2	in general, I am happy to visit Ecological Bank because they are friendly to the environment
	GS3	in general, I am satisfied with the Ecological Bank due to its environmental performance

4.3 Population and sample size

The target population for the following study is Egyptian bank customers. Therefore, the population is expected to be greater than one million, so taking adequacy of analysis and homogeneity of population, the study adopted the convenient sampling technique. In this study after cleaning and filtering the data a sample of 301 questionnaires have been used for the statistical tests.

4.4 Data collection

The data collection instrument in this research is a structured questionnaire that provides quantitative data to test specific hypotheses and examine the relationship among the variables. The main data was collected from Egyptian bank customers. Data was collected in English and Arabic language by creating a hyperlink through **https://docs.google.com.** Afterwards, this link was sent to the sample through different electronic channels and applications such as email and social media channels.

4- Results & Respondents

A total of 324 Egyptian banking customers participated in the study. The dataset has no missing values, and data cleaning of suspicious response patterns (i.e., straight-lining) reduced the sample size to 301 observations (Hair *et al.*, 2014). Thus, the researcher has run the statistical analysis using the 301 valid observations as a sample size. The demographic characteristics of the participants showed (54%) of the sample size which indicates almost an equal percentage between the females and the males in their interest in the green environment. Also (86%) of the participants are below 45 years old, and this big percentage highlights the youth's interest in environmental issues and green practices. Moreover, the results show (90%) of the sample are less than 20 years of job experience, and (97%) are undergraduates and hold bachelor's degrees. The demographic characteristics of participants can be described as shown in **Table (2)**:

Table (2): Participants' demographic profile

Demographic Variable	Total sample $n = 301$	
	Frequency	Percent
Gender		
Male	139	46.2
Female	162	53.8
Age		
> 25 years	122	40.6
25 to < 45	138	45.8
≥ 45	41	13.6
Education Level		
Undergraduate	124	41.2
Bachelor's	167	55.5
Master's Degree	6	2.0
Degree Ph.D. or higher	4	1.3
Job experiences		
From zero to less than 5 years	131	43.5
From 5 to less than 20 years	143	47.5
From 20 to less than 35 years	27	9.0

Source: By the researcher, based on the results of IBM SPSS Statistics software, version 26

5.1 Assessment of measurement model

Partial least squares structural equation modeling (PLS-SEM) was employed to estimate the measurement model and evaluate the validity and reliability of study components using the statistical software application Smart PLS version 3.2.9 (Ringle et al., 2005).

Table (3) and Figure (2) present the PLS findings related to the constructs' measurement model: Green Banking Initiatives (GBI), Co-Creation (CC), Green Customer Loyalty (GL), and Green Customer Satisfaction (GS). The results confirm the internal consistency reliability of all measurements, as composite reliability (CR) and Cronbach's alpha exceed the threshold of 0.70 for all constructs (Nunally & Bernstein, 1994). Additionally, all outer loadings (λ) surpass the 0.708 criteria, and each indicator's reliability (λ^2) is above the minimum of 0.50 (Hair et al., 2014). While CC_1 has the lowest indicator reliability (outer loading: 0.727, reliability: 0.529), GS_2 exhibits the highest reliability (outer loading: 0.868, reliability: 0.753).

Furthermore, all constructs have average variance extracted (AVE) values exceeding the recommended threshold of 0.50, affirming convergent validity (Hair et al., 2014). One item, GBI_4, was removed from the Green Banking Initiatives scale due to its outer load falling below the accepted value of 0.708. Removing this item improved the composite reliability and AVE of the respective construct (Hair et al., 2011).

Cross-loadings were examined to assess discriminant validity. As no cross-loadings exceeded the corresponding outer loadings, the PLS results confirm the discriminant validity of all constructs in the model (Hair et al., 2011)

Table (3): PLS results for the measurement model

Constructs and indicators	Convergent validity			Internal consistency reliability	
	λ	λ^2	AVE	CR	Cronbach's alpha
Green Banking Initiatives			0.716	0.883	0.802
GB_1	0.840	0.706			
GB_2	0.849	0.721			
GB_3	0.850	0.723			
Co-Creation			0.630	0.872	0.804
CC_1	0.727	0.529			
CC_2	0.804	0.646			
CC_3	0.805	0.648			
CC_4	0.835	0.697			
Green Customer Satisfaction.			0.733	0.891	0.817
GS_1	0.854	0.729			
GS_2	0.868	0.753			
GS_3	0.846	0.716			
Green customer loyalty			0.681	0.895	0.844
GL_1	0.836	0.699			
GL_2	0.807	0.651			
GL_3	0.813	0.661			
GL_4	0.844	0.712			

Note: λ stands for outer loadings; λ^2 stands for indicator reliability; AVE stands for average variance extracted; and CR stands for composite reliability

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

Figure (2): presents the PLS statistical finding related to constructs' measurements model; Green Banking Initiatives (GBI), co-creation (CC), Green Consumer Loyalty (GL), and Green Customer Satisfaction (GS). The finding confirms the internal consistency reliability of all measurements as the composite reliability (CR) and Cronbach's alpha are more than 0.70 for all constructs (Nunally & Bernstein,1994).

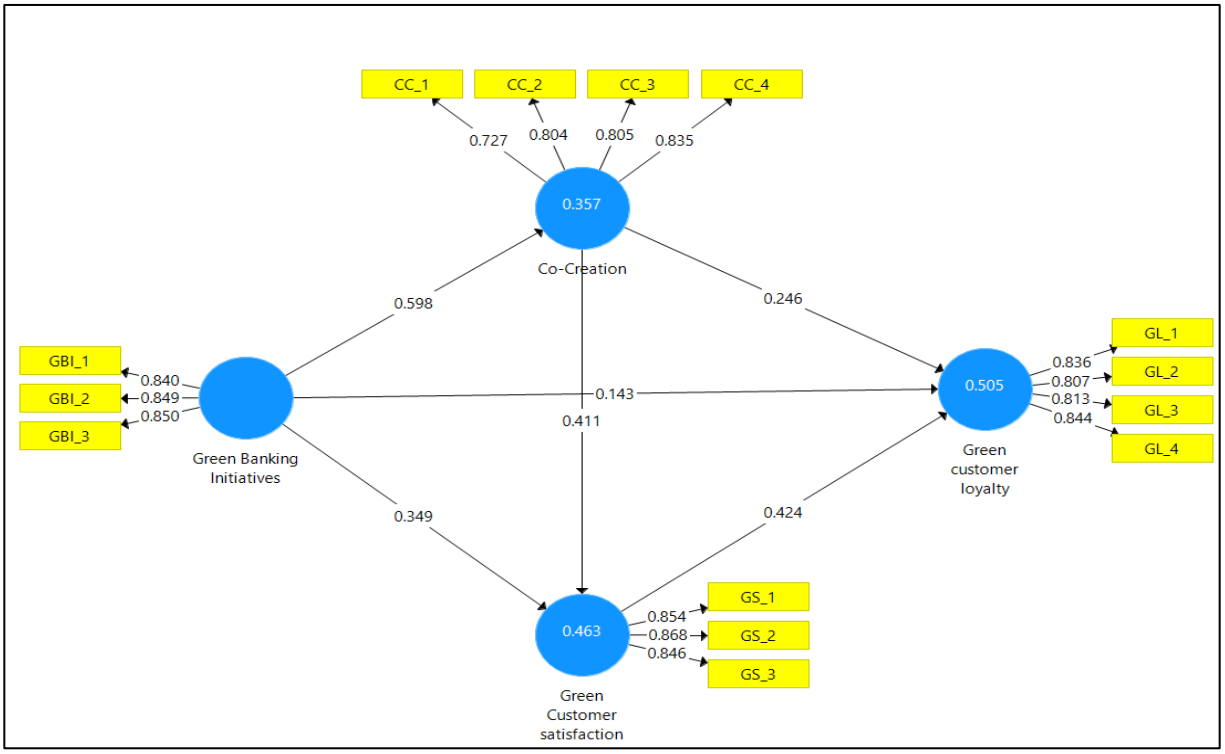


Fig. (2): Structural and measurement models estimate.

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

Table (4) reveals the research sample attitudes toward the study variables. The participants have positive attitudes toward the four variable dimensions, with mean values of 3.709, 3.532, 3.744, and 3.677 respectively.

Table (4): Research sample attitudes toward variables under consideration

Research variables	One-Sample Statistics		One-Sample Test (Test value = 3)			
	Mean	Std. Deviation	Mean Difference	Std. Error	t-value	p-value
Green Banking Initiatives	3.709	0.622	0.709***	0.036	19.782	< 0.001
Co-Creation	3.532	0.687	0.532***	0.039	13.455	< 0.001
Green Customer satisfaction	3.744	0.799	0.744***	0.046	16.150	< 0.001
Green customer loyalty	3.677	0.754	0.677***	0.043	15.572	< 0.001

*** Mean difference is significant at $p < 0.01$

Source: By the researcher, based on the results of IBM SPSS Statistics software, version 26

Table (5) presents the results of the Fornell-Larcker criterion, showcasing the square root of each construct's Average Variance Extracted (AVE). The findings reveal that the square roots of the AVEs for all constructs exceed their correlations with other latent variables in the path model. This demonstrates strong discriminant validity, confirming that each construct is distinct and adequately measured within the structural model. These results provide robust evidence supporting the validity of the constructs in the analysis.

Table (5): PLS results of Fornell-Larcker criterion and correlation matrix of constructs

	Green Banking Initiatives	Co-Creation	Green Customer satisfaction	Green customer loyalty	AVE
Green Banking Initiatives	0.846				0.716
Co-Creation	0.598**	0.794			0.630
Green Customer satisfaction	0.595**	0.620**	0.856		0.733
Green customer loyalty	0.543**	0.595**	0.662**	0.852	0.681

Note: The square root of AVE values is shown on the diagonal; nondiagonal elements are the latent variable correlations, *** Significant at p < 0.001

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

Table (6) shows the results of the assessment of multi-collinearity among the predictor constructs. The results show the variance inflation value VIF, is below the threshold of 5, indicating that, no collinearity issue in the research structural model (Hair et al., 2011).

Table (6): Variance inflation factor for collinearity assessment

Constructs	VIF	
	First set	Second set
Green Banking Initiatives	1.556	1.783
Co-Creation	1.556	1.871
Green Customer satisfaction		1.861

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

Table (7) presents the Partial Least Squares (PLS) results for the structural model used in the study. As shown in Table (7), the hypothesis testing results indicate that all hypotheses proposed in the structural model are accepted. This provides robust support for the relationships established in the model.

The findings reveal a positive and significant relationship between Green Banking Initiatives and Customer Co-Creation, supporting the first hypothesis in the structural model. Specifically, the relationship was found to have a path coefficient of 0.598, a t-value of 11.983, and a p-value of less than 0.001. These results strongly substantiate the hypothesis and align with prior research. Green banking initiatives, which often incorporate environmentally friendly practices and innovative banking solutions, foster greater customer involvement and collaboration. This relationship emphasizes the importance of sustainable banking practices in enhancing customer engagement and co-creation efforts.

The results also demonstrate a significant positive relationship between Green Banking Initiatives and Green Customer Satisfaction, with a path coefficient of 0.349, a t-value of 7.045, and a p-value of less than 0.001. This supports the third hypothesis in the model. This finding aligns with existing literature. For instance, Herath and Herath (2022) identified a positive impact of green banking initiatives on customer satisfaction within the public sector commercial banks of Sri Lanka. Similarly, Hossain et al. (2015) observed an enhancement in customer satisfaction among private bank customers due to green banking practices,

particularly through the adoption of e-banking services. Agrawal (2009) also highlighted the positive influence of technology-driven banking services on overall customer satisfaction. However, contrasting findings were reported by Martins et al. (2014), who discovered that many customers preferred traditional banking services over technologically advanced green banking solutions. This discrepancy highlights the varying customer preferences and the potential challenges faced by banks in balancing technological advancements with customer expectations.

A significant positive relationship was also identified between Customer Co-Creation and Green Customer Satisfaction, with a path coefficient of 0.411, a t-value of 8.830, and a p-value of less than 0.001. This supports the sixth hypothesis and resonates with prior research. For example, Grissemann and Stokburger (2012) found a strong positive relationship between customer satisfaction and co-creation performance in the tourism industry. Similarly, Opata et al. (2021) reported a positive association between customer co-creation and satisfaction in their study on automobile customers in Ghana. Other scholars, such as Bordian et al. (2022), have emphasized that customer engagement in organizational green practices significantly enhances satisfaction levels. These findings underline the critical role of customer involvement in green initiatives, demonstrating that co-creation not only boosts satisfaction but also fosters stronger customer relationships.

The study further reveals a positive and significant relationship between Customer Co-Creation and Green Customer Loyalty, with a path coefficient of 0.246, a t-value of 3.932, and a p-value of less than 0.001. This supports the second hypothesis and aligns with several previous studies. For instance, Raza et al. (2020) demonstrated a direct and significant relationship between customer co-creation and loyalty in their research involving 280 banking customers in Pakistan. Similarly, Hosseini & Hosseini (2013) and Nysveen & Pedersen (2014) highlighted the positive influence of co-creation on customer loyalty within the banking sector. Kaufmann et al. (2016) further argued that customer loyalty increases with greater engagement in co-creation activities. Additionally, Hajli et al. (2017) reported a positive impact of customer co-creation on loyalty in their study on banking services. These findings emphasize the value of co-creation in fostering loyalty, as customers who actively participate in shaping banking services are more likely to develop a sense of commitment and allegiance to the institution.

The study also identifies a significant positive relationship between Green Customer Satisfaction and Green Customer Loyalty, with a path coefficient of 0.424, a t-value of 6.162, and a p-value of less than 0.001. This supports the fourth hypothesis and is consistent with prior research. Bowen and Chen (2001) highlighted a strong positive correlation between customer satisfaction and loyalty, suggesting that satisfied customers are more likely to remain loyal to a brand. Similarly, Spiteri and Dion (2004) reported a positive relationship between satisfaction and loyalty, reinforcing the importance of customer satisfaction in building long-term relationships. These findings underscore the pivotal role of satisfaction in driving customer loyalty, particularly in the context of green banking, where customers are increasingly prioritizing sustainability and environmental responsibility.

Finally, the results indicate a positive and significant relationship between Green Banking Initiatives and Green Customer Loyalty, with a path coefficient of 0.143, a t-value of 2.382, and a p-value of 0.017. This supports the fifth hypothesis and aligns with previous research. For instance, Binder and Blankenberg (2017) identified a positive correlation between green banking initiatives and customer loyalty. Chen (2010) also found a significant relationship between green value and customer loyalty. Furthermore, Ibe-enwo et al. (2019) highlighted the direct and significant influence of green banking practices on customer loyalty within the retail banking sector in North Cyprus. These findings highlight the importance of green banking initiatives in fostering loyalty, as customers increasingly value environmentally conscious practices. Banks that adopt and promote green initiatives can strengthen their relationships with customers, building trust and long-term loyalty.

The findings of this study provide strong support for the proposed structural model. The results demonstrate the significant positive relationships between green banking initiatives, customer co-creation, customer satisfaction, and loyalty. Furthermore, these findings show the importance of adopting sustainable practices and fostering customer engagement in driving satisfaction and loyalty. By prioritizing green initiatives and involving customers in co-creation processes, banks can achieve greater customer satisfaction and loyalty, ultimately contributing to their long-term success.

Table (7): PLS results for structural model

Hypotheses	Path			Path coefficient	Standard Error	$\|t\|$ value	P Values	R^2	f^2	Rank	Hypotheses testing results
H1	Green Banking Initiatives	→	Co-Creation	0.598***	0.050	11.983	< 0.001		0.556	--	Supported
								0.357			
H3	Green Banking Initiatives	→	Green Customer satisfaction	0.349***	0.050	7.045	< 0.001		0.145	2	Supported
H6	Co-Creation	→	Green Customer satisfaction	0.411***	0.047	8.830	< 0.001		0.202	1	Supported
								0.463			
H2	Co-Creation	→	Green customer loyalty	0.246***	0.063	3.932	< 0.001		0.066	2	Supported
H4	Green Customer satisfaction	→	Green customer loyalty	0.424***	0.069	6.162	< 0.001		0.196	1	Supported
H5	Green Banking Initiatives	→	Green customer loyalty	0.143***	0.060	2.382	0.017		0.023	3	Supported
								0.505			

Notes: *** , ** and * refer to statistical significance at the 0.01, 0.05 and 0.1 levels, respectively

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

Table (8) shows the PLS results for the indirect path of the structural model, the hypothesis of the model shown in Table (8) indicates that the indirect path proposed in the structural model are accepted. The result shows that GBA → CC → GL are significant at (Indirect Path = 0.147, t = 3.834, p < 0.001) which indicates that Customer Co-Creation partially mediates the relationship between green banking activities and Green Customer loyalty. The results also show a complementary mediation effect, which means that the indirect effect and the direct effect are both significant and point in the same direction (Zhao, Lynch, and Chen 2010). In the same vein, the results also show a significant relation in the second indirect bath in the structural model between GBA → GS → GL at (Indirect Path = 0.148, t = 4.566, p < 0.001), which also indicates a complementary mediation effect and both the direct and indirect effect point in the same direction (Zhao, Lynch, and Chen 2010).

Table (8): PLS results for structural model

	Indirect Path effect	Standard Error	$\|t\|$ value	P Values	Mediation testing results
GBA -> CC-> GL	0.147***	0.038	3.834	< 0.001	Supported
GBA -> GS -> GL	0.148***	0.032	4.566	< 0.001	Supported

Notes: ***, ** and * refer to statistical significance at the 0.01, 0.05 and 0.1 levels, respectively

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

5- Conclusion

This study sheds light on the pivotal role of green banking initiatives in fostering green customer loyalty within the banking sector in Egypt. By empirically testing the relationships between green banking practices, customer satisfaction, customer co-creation, and customer loyalty, the research provides significant evidence that green banking initiatives directly enhance green customer loyalty. Which aligns with previous research. For instance, Binder and Blankenberg (2017) identified a positive correlation between green banking initiatives and customer loyalty. Chen (2010) also found a significant relationship between green value and customer loyalty. Furthermore, Ibe-enwo et al. (2019) highlighted the direct and significant influence of green banking practices on customer loyalty within the retail banking sector in North Cyprus. Additionally, the findings reveal that green customer satisfaction and customer co-creation partially mediate this relationship, highlighting the importance of these factors in strengthening the bond between banks and their environmentally conscious customers. These insights contribute to the growing body of literature on green banking and underscore the importance of integrating sustainability into banking operations to meet the rising demand for greener practices.

6- Managerial Implications

For banking institutions aiming to achieve a competitive edge in the increasingly sustainability-focused market, the findings of this study offer critical insights:

- Prioritize Green Banking Initiatives: Banks should actively implement and promote green banking practices as they directly influence customer loyalty. By adopting environmentally friendly operations, banks can attract and retain customers who are increasingly inclined towards sustainability. This aligned with the current research results which investigated the significant effect of the direct relationship between GBI and green customer loyalty.
- Enhance Customer Satisfaction through Sustainability: The partial mediation effect of green customer satisfaction suggests that banks should focus on delivering high levels of satisfaction by ensuring that

their green practices meet customer expectations. This could involve transparent communication of green initiatives and their impacts, as well as delivering tangible environmental benefits.

- Encourage Customer Co-Creation: Engaging customers in the co-creation of green products and services can further strengthen their loyalty. Banks should create platforms that allow customers to contribute ideas and feedback on green initiatives, fostering a sense of ownership and commitment to the bank's sustainability goals.
- Strategic Marketing of Green Initiatives: Banks should strategically market their green initiatives, emphasizing their commitment to sustainability. This can enhance their brand image and attract environmentally conscious customers, thereby increasing customer retention and loyalty.

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الملخص

مع تزايد الاهتمام بالاستدامة البيئية، يضغط العملاء بشكل متزايد على الشركات في بيئة الاعمال لتبني ممارسات خضراء حقيقية. ولقد أدى الطلب المتزايد على مجتمع الاعمال نحو التوجه إلى هيكلة عمليتها لتكون أكثر استدامة. هذا وقد ادي ذلك إلى دفع البنوك كأحد ركائز مجتمع الأعمال إلى التركيز بشكل أكبر على مفهوم ممارسات البنوك الخضراء، وذلك من أجل تحقيق ميزة تنافسية وتعزيز ولاء العملاء الأخضر أو المهتمين بالاستدامة. وعلى الرغم من أن بعض المتغيرات البحثية التالية قد تم تسليط الضوء عليها في الدراسات السابقة، إلا أن العلاقة بين هذه المتغيرات لم يتم تناولها في الأدبيات الحالية بشكل مفصل ومن ثم، تهدف الدراسة الحالية إلى التحقيق في العلاقة المباشرة بين مبادرات البنوك الخضراء وولاء العملاء الأخضر أو المهتمين بالاستدامة. كما اختبرت الدراسة التأثير الوسيط لرضا العملاء الأخضر ومشاركة العملاء في الإبداع على العلاقة المباشرة بين مبادرات البنوك الخضراء وولاء العملاء الأخضر في القطاع المصرفي في مصر. علاوة على ذلك، استخدمت الدراسة تقنية أخذ العينات الميسرة، وتم جمع البيانات من ٣٠١ عميل مصرفي في مصر. تم استخدام نموذج المعادلات الهيكلية لاختبار العلاقات محل البحث بشكل متزامن. وقد دعمت النتائج جميع العلاقات المباشرة محل البحث في الإطار المفاهيمي للدراسة. علاوة على ذلك، أظهرت النتائج تأثير الوساطة الجزئي في المسار غير المباشر لرضا العملاء الأخضر ومشاركة العملاء في الإبداع في العلاقة بين مبادرات البنوك الخضراء وولاء العملاء الأخضر.

الكلمات الرئيسية: ولاء العملاء الأخضر، مبادرات البنوك الخضراء، رضا العملاء الأخضر ومشاركة العملاء في الإبداع