

Green Banking and Perceived Financial Performance of Nepalese Commercial Banks

Nrip Chad^{1*}

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¹Achham Multiple Campus, Mangalsen, Achham, Nepal

*Corresponding Author: Email: chadnrip2072@gmail.com ORCID: <https://orcid.org/0009-0004-6932-9039>

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ABSTRACT

The objective of this study is to analyze the relationship between green banking and the perceived financial performance of commercial banks in Nepal. There are four organizational aspects of green banking: green products and services, green investments, green business strategies, and green human resource management. Financial performance is evaluated by efficiency, effectiveness and economy (not just profitability), thus going beyond merely a single measure of financial performance. An explanatory survey was conducted in a cross sectional manner with the respondents consisting of 373 middle level staff of five prominent commercial banks of Nepal. A five-point Likert scale structured questionnaire was used to collect data, and descriptive statistics, Pearson correlations, multiple regression, and variance inflation factors were used to analyse the data. Green products and services received the highest mean rating ($M = 4.23$, $SD = 0.72$), followed by green business strategies ($M = 4.12$, $SD = 0.68$), green investments ($M = 3.89$, $SD = 0.84$), and green human resource management ($M = 3.45$, $SD = 0.91$). The four dimensions of green banking explained 54.2% of the variance in the efficiency, 51.1% in effectiveness, and 47.8% in economy. In all three models, green business strategies are the strongest predictor, followed by green products/services. Green human resource management was positively correlated with efficiency and marginally correlated with effectiveness and was not correlated with economy. The results provided a strategic perspective on green banking: on the one hand, systems that involve people could take some time before visible economic effects are produced, while on the other hand, systems that focus on the environment and are implemented by the banks can strengthen bank performance through digital delivery, resource efficiency, and disciplined environmental investment. The study uses cross sectional perceptual data and the results do not imply cause and effect. It offers context-specific evidence from a developing banking system and offers some implications for bank executives, regulators, and researchers aiming to move towards a balance of environmental responsibility with operational resilience and financial discipline.

Keywords: Green banking, sustainable finance, commercial banks, perceived financial performance, efficiency

INTRODUCTION

Banks play a unique role in the process of shifting towards sustainable environmental development. They have an actual footprint in their own activities, such as their branches, data centres, procurement systems, their employee travel, and the use of paper; their impact is also indirect, due to how they appraise credit, allocate investments, underwrite and design financial products. Therefore, banking institutions

cannot be considered as environmental neutral intermediaries. There are decisions that might seem financial in nature when taking place at the transaction level, but affect patterns of energy use, industrial production, infrastructure development, land use and technological innovation across a long time horizon. Green banking has been seen as an effective solution to this responsibility. It incorporates environmental

aspects into internal processes and external financing, and aims to ensure that the risk management, service quality and commercial viability are prudent.

The strategic importance of green banking is supported by the fact that the environmental and social behavior can affect corporate risk, reputation, financing rates and long run value. Since resource efficiency and environmental capability can save waste, generate innovation, and buffer firms from regulatory and reputational shocks; research on corporate environmental performance establishes that these attributes can be a source of competitive advantage (Hart, 1995; Klassen & McLaughlin, 1996; Russo & Fouts, 1997). Recent research shows that robust sustainability systems can lead to better stakeholder trust and resilience, especially in times of market stress (Eccles et al., 2014; Lins et al., 2017). Similarly, large-scale reviews also show that on average, there is not a negative relationship between ESG performance and financial results; however, there is significant variation by context, measures and time horizon (Friede et al., 2015; Orlitzky et al., 2003). The results do not mean that all green projects will be profitable. They propose, however, that value is created when environmental actions are part of the governance, working procedures, risk assessments and market strategies, rather than seen as a symbolic communication of the company.

This is especially significant in the banking sector. Environmental responsibility may impact the front and back of a bank's business model. For the liability and service side, digital banking, electronic statements, mobile apps, remote customer verification and virtual communication can help minimize transaction costs, crowding in branches, paper usage and travel. Internet and digital banking evidence suggests that the benefits of technological adoption stem from scale, process redesign, and customer adoption and may not be immediately realized because technology can take a significant amount of upfront investment and organizational change (DeYoung, 2005; Hernando & Nieto, 2007; Scott et al., 2017). Environmental screening and green lending can enhance the identification of regulatory, technological and collateral risks on the asset side. Renewable-energy finance, green buildings, climate-resilient infrastructure, green bonds, and sustainability-linked products are also other markets that banks could explore in the future. Climate and environmental

performance can impact the terms and availability of finance, and green credit policies can impact banks' risk exposure, as demonstrated by research in lending (Cui et al., 2018; Goss & Roberts, 2011; Nandy & Lodh, 2012; Weber et al., 2008).

Nepal is a useful context to explore these questions. Its commercial banks serve a developing financial market with a growing reliance on digital services, an imperfect infrastructure, a strong focus on urbanization, and a high demand for financing for energy, transport, construction, agriculture, tourism, and small business. Environmental risks are thus not only embedded in a specific portfolio of sustainability funds, but also in the very normal decisions of money-lenders. In parallel, the banking sector's green banking institutionalization is still incomplete. The digital services, support for renewable energy projects, and the introduction of measures that are resource-saving, etc. can be provided by individual banks, but these are not necessarily connected in a coordinated strategy and do not have measurable consequences for performance. While some managers might agree with the idea of sustainability, they may not be confident in the criteria for appraising projects, their risk-adjusted returns, the capability of their staff to implement them, customer appetite for them, or the time needed until they begin to affect the financial performance.

The empirical issue is that business value of green banking in Nepal is not understood in an adequate manner. A one-sided perspective on accounting profitability would overlook some of the ways in which green banking can have an impact. The initial benefits of paperless transactions and energy-efficient branches are likely to be process efficiency. Environmental risk screening and new green products can enhance strategic effectiveness by further strengthening of compliance, market positioning, or stakeholder confidence. Resource discipline can help to save money through a reduction in operating cost and by maximizing capital utilization. These results are qualitatively different and can have varying reactions to identical green practice. For instance, a staff training programme may improve competence and control systemically before it results in cost savings that can be seen. On the other hand, a digital statement system could yield potential short-term efficiencies, with extra spending in the areas of cybersecurity and platform. It is therefore essential to view financial performance as a multidimensional

construct in order to make more credible assessment (Richard et al., 2009; Venkatraman & Ramanujam, 1986).

The present study attempts to fill this gap by looking at the perceived impact of four dimensions of green banking, namely green products/services, green investments, green business strategies and green human resource management on three dimensions of financial performance, namely efficiency, effectiveness and economy. The data for analysis is based on the responses from 373 Middle Level employees of five commercial banks. The middle-level employees have been selected as an analytically useful group because they not only interpret the strategic direction in terms of day-to-day operations, but are also able to see how resources and procedures are used and how they interact with both managers and other workers. They are not a substitute for audited financial information, but they can document organisational processes that won't be evident in balance-sheet data until later.

The article provides four contributions. Firstly, it provides evidence from a context where green banking is under-represented in existing literature, specifically Nepal. Second, it breaks down green banking into three aspects — operational, investment and strategic — and human resources, not using a single composite score. Third, it examines performance in terms of the 'three Es' of efficiency, effectiveness, and economy, allowing for a more differentiated description of the value of organizations. Fourth, it uses a conservative approach to cross sectional perceptual evidence: regression coefficients are interpreted as predictive (associative) relationships, and not causal relationships. This distinction will lend credibility to the conclusions and help define the need for further longitudinal and objective data study.

The following research objectives and questions guide this study:

The study pursues the following objectives:

1. To identify the relative level of implementation of green products and services, green investments, green business strategies, and green human resource management in selected Nepalese commercial banks.
2. To examine the bivariate relationships between the four green banking dimensions and perceived efficiency, effectiveness, and economy.

3. To estimate the unique predictive contribution of each green banking dimension to each performance outcome while controlling statistically for the other green banking dimensions.

To draw out managerial and policy implications that differentiate between short-term wins and long-term gains in building capabilities.

The study then asks: (1) What are the dimensions of green banking that are better implemented? (2) How are green banking dimensions related to efficiency, effectiveness, and economy? (3) Which dimensions remain significant predictors when considered simultaneously? and (4) What do the results imply for the sequencing and governance of green banking in Nepal?

Review approach to Hypothesis Development

Green banking as an organizational system

Green banking is essentially an organizational structure, not just a bunch of environmental projects. It covers internal eco-efficiency, environmentally-sound risk management, sustainable use of capital, digital and low-resource service delivery, employee capacity, governance, reporting and stakeholder engagement. This systems perspective is helpful in distinguishing between evidence of environmental integration and symbolic assertions. Organizations can make green statements while not altering fundamental decisionmaking processes, which is often referred to as greenwashing (Delmas & Burbano, 2011). Substantive implementation in banking involves environmental requirements for product development, credit assessment, investment approval, branch operations, performance management and staff development. The depth of implementation is as important as the number of initiatives reported.

A strategic perspective also acknowledges environmental management can have both costs and benefits. Conservation of resources can result in lower electricity, paper, travel and handling costs. Digital delivery could increase access and convenience. Environmental due diligence can reduce the risk of exposure towards projects that are subject to regulatory action, physical climate risks or technological obsolescence. Sustainability preference customers and investors may be attracted to green financial products. Banks are required to invest in

technology, train staff, collect data, prepare for specific appraisal needs, and deal with the unpredictable demand and the possible problem of maturity mismatches for long-term green projects, in exchange for these benefits. The ability to improve performance is therefore conditional on the quality of implementation, on complementarities, and on conditions institutional. The relationship is not mechanical, but rather contingent and can vary by efficiency, effectiveness and economy.

THEORETICAL FRAMEWORK

The stakeholder theory is that the long-term success of an organization relies on generating and maintaining value for a variety of groups with resources, legitimacy or influence that impact the company (Donaldson & Preston, 1995; Mitchell et al., 1997). Salient actors for banks are depositors, borrowers, employees, shareholders, regulators, communities, institutional investors and environmental groups. In line with the expectations of the stakeholders, green banking can respond by decreasing the footprint of the institution, avoiding financing of activities that are harmful to the environment and guiding investments toward social beneficial projects. These responses can enhance the legitimacy, reputation, trust, and attachment to the customer. Stakeholder theory also suggests the need of managing trade-offs, however. However, a green project with good policy goals could still be subject to unacceptably high credit risk if the project's appraisal is poor. Good green banking thus is not a battle of absolutes between environmental responsibility and fiduciary discipline, but rather combines the two.

The institutional theory (DiMaggio & Powell, 1983) can be used to explain the reasons behind the similarity of institutional practices. Coercive pressures come from legislation, regulations by the central bank, disclosure regulations, refinancing protocols, and public policy. Professional norms, education, industry associations and norms regarding responsible banking are all sources for generating normative pressures. When banks see others that seem legitimate, innovative or successful, they become tempted to imitate them due to mimetic pressures. Institutional pressure can drive the adoption of green banking, but can also lead to 'ceremonial compliance' where policies are in place but do not impact lending or operational decisions. Delmas and Toffel (2008)

demonstrate that the nature of organizational response to environmental pressure is a function of internal structure and configuration of stakeholders. This viewpoint implies that regulation alone will not create the necessary incentive to act unless banks have the data, skills, accountability and incentives to do so in Nepal.

According to the resource-based view, sustainable advantage is achieved by the presence of valuable, rare, difficult-to-imitate and organizationally embedded resources (Barney, 1991). In the context of capabilities for pollution prevention, product stewardship, and sustainable development, this logic is applied by Hart's (1995) natural-resource based extension. Financial institutions have several resources that can help them with this: Environmental credit skills, sector-specific technical knowledge, digital platforms, green product design, data architecture, risk models, financial partner relationships, and a culture that facilitates responsible decision-making. Competitors have an easier time copying a green label on a loan, than they have an easy time copying a well-developed appraisal process, solid environmental information, trained credit staffs, and a trusted track record of implementation. So, it is most apt that the performance of green banking will be best enhanced when built up step by step in order to achieve cumulative capabilities instead of being created as one-off promotional products.

The theory of planned behavior suggests that attitudes, subjective norms and perceived behavioral control determine the nature of the behavior (Ajzen, 1991). While created at the individual level, the framework may prove helpful in comprehending why employees might or might not implement a bank's environmental policies. Staff need to feel that green practices are useful, feel that their supervisors and peers expect them to do so and have the authority and capability, the knowledge, the technology and the time to do it. Through recruitment, induction, training, performance appraisal, rewards, participation, and leadership communication, green human resource management can impact all three of the above. The absence of these supports could render environmental policies inaccessible and disconnected from the everyday credit, procurement and service decisions. Green banking dimensions

Green products and services include mobile banking, internet banking, electronic statement, paperless, remote service, and financing for environmentally positive activities. These performance impacts may happen at scale, convenience, service speed, and by decreasing the need for physical documentation. Internet banking research indicates that the digital channel may enhance bank performance once the costs of implementation have been recouped and the use of the channel is sufficiently adopted (DeYoung, 2005; Hernando & Nieto, 2007). Standards, network participation, and process integration (Scott et al., 2017) can also drive lasting advantages for organizations when combined with digital innovation. Digitalization must not be just linked to environmental improvement. Environmental costs of data centres, devices, cyber security and electronic waste. A credible green product strategy therefore measures the net resource use and customer outcomes, as opposed to just swapping out paper with screens.

Digital services can cut the travel to the bank, queuing time, printing, storage and manual handling requirements for banks in Nepal. They can also reach out to non-urban areas. Reduced unit transaction costs, expanded service capacity and customer retention can enhance the financial performance. But poor connectivity, digital illiteracy, fraud, and duplicate paper and digital processes can diminish projected savings. The study consequently regards green products and services as a possible, but not assured predictor of all three dimensions of performance. Green investments are defined as the provision of loans, securities, project finance and other forms of capital that finance renewable energy, energy efficiency, sustainable buildings, cleaner production, resilient infrastructure and environmental goals. There are two ways that they are financially relevant. One, they have the ability to develop new lending and fee opportunities. Second, environmental appraisal can safeguard asset quality, by uncovering liabilities, regulatory exposure, physical risk and technological transition risk. Research on the link between bank lending and corporate environmental performance reveals that improving the performance of a company's environmental management can lead to more favourable financing conditions for the company and that banks use environmental information when it is decision-relevant in granting or denying credit (Goss & Roberts, 2011; Nandy & Lodh, 2012; Weber et al.,

2008). There is also evidence from China that green lending policies have a potential impact on credit risk, but the sign and magnitude is a function of implementation and borrower characteristics (Cui et al., 2018).

Valuation problems are also faced in green investments. The long maturities, technical expertise, policy stability, and specialized collateral assessment may be needed for renewable-energy and infrastructure projects. Construction, market, governance, currency and repayment risk are not negated by environmental benefits. A robust green investment approach therefore involves a taxonomy, technical due diligence, risk based pricing, monitoring and portfolio limits. In an early stage market, performance effects may be less of a factor, as does deal origination and capability development.

Green business strategies integrate environmental concerns into the bank's business model. This can include things like energy efficiency branches, procurement guidelines, waste minimisation, virtual meetings, low carbon travel, internal reporting, targets, environmental risk integration, and management accountability. This dimension is more expansive than individual products, it impacts on routines as a whole in the organization. Proactive practices are suggested to enhance financial results in the field of environmental management through efficiency, innovation, and decreased exposure to negative events (Klassen & McLaughlin, 1996; King & Lenox, 2001; Russo & Fouts, 1997). This will be most effective when environmental activities are integrated into competition and operation goals, as opposed to being seen as extra corporate-social-responsibility initiatives.

Energy management, paper control, virtual communication, workflow simplification and systems of risk prevention can provide relatively direct benefit to banks. Digital services, employee training, procurement and green lending can all support each other when managed under the same goals and measures of success – strategic coherence avoids duplication. This dimension reflects integration across the entire organization, and so is likely to be strongly correlated with efficiency and effectiveness. Green human resource management involves integrating human resource management practices with environmental goals. This can be the

environmentally conscious design of jobs, recruitment, induction, training, employee participation, appraisal, rewards, leadership development and recognition. The research has shown that green HRM is capable of influencing the environmental behavior of employees through the enhancement of ability, motivation and opportunity (Dumont et al., 2017; Paillé et al., 2014; Renwick et al., 2013). Similarly, Tang et al. (2018) demonstrate that green HRM is more than just one training intervention, it is a multidimensional construct. In banks, the implementation of green HRM is crucial as the credit officer, branch manager, procurement, risk, and product team will have to make a judgement on the environmental policy.

Financial impacts of green HRM may still come with a time lag, however. Obviously, training costs are incurred and can temporarily decrease productive time. Supervisory reinforcement, incentives, systems and role clarity are all important for behaviour change. Green HRM can therefore help to enhance efficiency by minimizing errors and reinforcing routines before it can bring about economy. It could also be indirect, via green strategy implementation, innovation and culture. The longer term contribution may then be underestimated in this cross-sectional regression, which includes operational green practices.

Financial performance (perception): Efficiency, effectiveness and economy

Organizational performance is multi-dimensional, and is not fully captured with one metric (Richard et al., 2009). Financial instead of operational or organizational outcomes have been distinguished in strategic management research and informed managerial assessments have been given value when there are no comparable objective data or when they are not available (Dess & Robinson, 1984; Venkatraman & Ramanujam, 1986). The research in this study uses three dimensions. In terms of efficiency, the inputs and outputs should relate to one another: time, labour, energy, information and capital resources should be used with minimum waste. Effectiveness relates to the achievement of strategic and operational goals such as service quality, compliance, market development and implementation of sustainability objectives. Economy is related to the

procurement and utilization of resources at a suitable cost ensuring the appropriate quality and control.

The three dimensions are not mutually exclusive. A bank can run more efficiently, but be less effective in terms of strategy. It could reach green finance goals without having a negative impact on the short-term economy. The reverse, however, may be true: When there is a trade-off in reduced costs that lead to reduced controls, it creates a sense of economy at the expense of effectiveness and risk management. Breaking down the dimensions allows for the observation of these differences and obviates the assumption that all green banking practices have an equally strong impact on all dimensions of performance.

Sustainability, reputation, risk, and financial value

The idea that sustainable activities can create financial value is well supported by a wider array of evidence. Market responses and operating outcomes have been linked to the performance of a company's environmental activity (Klassen & McLaughlin, 1996; Russo & Fouts, 1997). Some companies with high sustainability governance have been observed to exhibit varying organizational processes and longer-term performance patterns compared to their matched counterparts (Eccles et al., 2014). Figure 1 presents the generally positive results from the meta-analytic evidence on the relationship between corporate social/environmental performance and financial performance, but publication design, industry and measurement do play a role (Friede et al., 2015; Orlitzky et al., 2003). While causal inference is still a challenge, evidence from regression discontinuity suggests that under certain circumstances, shareholder sponsored CSR can lead to performance gains (Flammer, 2015).

Social and environmental responsibility, in the context of financial institutions, can impact reputation, trust, loan pricing, and resilience. The motives of bank CSR have been identified as important determinants of financial performance by Wu and Shen (2013); and the association between CSR and bank performance also shifted following the global financial crisis, demonstrated by Cornett et al. (2016). At the sector level, a variety of labels exist but they cover significant differences in social responsibility in international banking, as documented

by Scholtens (2009). Capital markets are also affected by sustainable financing instruments. The pricing benefits for green bonds to investors may be negligible but they can be more significant to the issuer, and can stimulate demand from investors, although credibility is an important condition for this effect (Tang & Zhang, 2020; Zerbib, 2019; Flammer, 2021). These studies suggest that there is a balance to be struck: Green banking has the potential to generate value, but trust, governance and implementation quality are key. This is made even more urgent by the financial risk from climate change. Climate risk is becoming more and more of a financial material for institutional investors (Krueger et al., 2020), and carbon exposure can impact asset pricing (Bolton & Kacperczyk, 2021). Some banks might be mispricing credit and collateral if they fail to consider the environmental and transition risks, while others might be losing potential customers and transition opportunities by restricting credit too broadly. Green banking should thus be defined as a rationalised approach to risk/return management, rather than as a set of 'green' finance operations.

Hypotheses

Based on the theoretical and empirical arguments, the study tests the following directional hypotheses for each performance dimension:

H1a-H1c: Positive relationships between green products and services with perceived efficiency, effectiveness and economy.

H2a-H2c: Green investments are positively associated with perceived efficiency, effectiveness, and economy.

H3a-H3c: Green business strategies are positively associated with perceived efficiency, effectiveness, and economy.

H4a-H4c: Green human resource management is positively associated with perceived efficiency, effectiveness, and economy.

METHODOLOGY

Research Design

The study was conducted in a quantitative, cross sectional-explanatory survey design. The design is suitable for determining the extent and direction of relationships between measured organizational constructs at a given point in time. It is considered explanatory rather than causal due to the fact that the data was collected at one point in time, respondents were not randomly assigned to conditions, and temporal precedence cannot be drawn for analysis. The predictive associations are estimated through multiple regression, after controlling for the overlap between the dimensions of green banking. Thus, in the practical discussion, words like 'effect' refer to statistical contributions in the models and do not indicate experimental causation.

Population, Sampling, and Respondents

The target population was middle-level professionals working in commercial banks of Nepal. These individuals were chosen because middle managers and similar occupations generally have an understanding of branch operations, product delivery, staff implementation, resource utilization, and the implementation of institutional policies. Respondents were selected using purposive sampling method to ensure that there are respondents who have relevant organizational experiences. A total of 373 employees of five prominent commercial banks in Kathmandu and other regional centres were included in the final sample. The data was collected online via email questionnaires and paper questionnaires over four months, from 1 January to 31 April 2025. The use of both modes has helped to enhance accessibility may have also resulted in mode-specific differences in responses that were not separately estimated.

The reported multiple regressions, each with four predictors, have a sample size that is sufficient for these models. However, there are five banks with purposive selection and concentration to restrict population inference. The results should be generalized analytically on similar commercial bank setting and managerial processes rather than statistically to all financial institutions in Nepal. The regulatory, technological and client situations of development banks, finance companies, microfinance institutions and cooperatives can be different. Instrument and measurement

A structured questionnaire with a 5-point (from strongly disagree to strongly agree) Likert-format scale was used to collect data. The instrument involved demographic questions, questions on green banking and questions on perceived financial performance. A set of eight items which covered digital banking, electronic statements, mobile and internet banking, and associated paperless services was used to measure green products and services. Green investments were assessed by six questions related to financing of environmentally friendly projects including projects in the renewable energy field. The seven items that were used to measure green business strategies included energy efficiency, waste management and management of virtual communication, and sustainable operating procedures. The measuring items for Green human resource management consisted of six items related to employee training, employee awareness, recruitment, and employee involvement.

Financial performance was assessed in terms of efficiency (7 items), effectiveness (7 items), and economy (6 items). Efficiency items measured the utilization of resources, process speed, and output to inputs. Achievement of strategic, regulatory, service and market objectives were captured in effectiveness items. The economy items evaluated operating-cost control and capital utilization. The principle of this operationalisation is that organisational performance should be evaluated across several domains that are theoretically distinct from each other, instead of making a single overall judgement (Richard et al. 2009). The constructs are perceptual in nature and are intended to reflect informed employee evaluations and should not be construed as audited return on assets, return on equity, net interest margin, or cost-to-income ratios.

Table 1
Construct operationalization

Construct	Code	Items	Operational focus
Green products and services	GPS	8	Digital channels, electronic statements, mobile/internet banking, paperless service
Green investments	GI	6	Financing and investment in renewable energy and environmentally sustainable projects

Construct	Code	Items	Operational focus
Green business strategies	GBS	7	Energy efficiency, waste reduction, virtual meetings, sustainable operations and management routines
Green human resource management	GHRM	6	Environmental training, awareness, recruitment and employee participation
Efficiency	EF	7	Resource utilization, process optimization and output relative to inputs
Effectiveness	EFF	7	Achievement of strategic, regulatory, service and green-market objectives
Economy	EO	6	Operating-cost control and efficient use of capital and other resources

Piloting, Reliability and Validity Issues

A questionnaire draft was pilot-tested with 30 banking professionals for wordings, clarity and internal consistency. Cronbach's alpha coefficients for all constructs in this source study are above 0.70, which is considered acceptable for research scales. Cronbach's alpha continues to be a popular measure of internal consistency (Cronbach, 1951) but does not demonstrate unidimensionality or construct validity alone. A comprehensive future validation should include item loadings, composite reliability, average variance extracted and discriminant validity, while keeping in mind the limitations of using the threshold rules mechanically (Fornell & Larcker, 1981). The present analysis thus reports only on alpha reliabilities as an indication of acceptable reliability, and does not make stronger claims about measurement equivalence or factor structure not tested in the data available.

Data Preparation and Statistical Analysis

The data were screened, cleaned, coded and analyzed using IBM SPSS Statistics and Microsoft Excel software. Demographic characteristics were summarized as frequencies and percentages. The implementation of green banking and level of perception of the performance was described by means and standard deviations. A bivariate linear association

for each pair of constructs was measured by Pearson correlation coefficients. Three multiple-regression models were then estimated with efficiency, effectiveness, and economy as the dependent variables. Both GPS and GI, GBS and GHRM were simultaneously entered into each model. Within each of these models, a standardized beta coefficient was used to compare the relative strength of the prediction. Reported p values were used to establish statistical significance and a value of $p < .05$ was considered the standard decision criterion. Specific p values are provided when available and those that are reported as .000 in the source output are reported as $p < .001$ in line with reporting standards.

Multicollinearity was evaluated by looking at variance inflation factors. The reported VIFs range between 1.112 and 1.456, well below the common concern, values, suggesting that the predictors do not show problematic linear redundancy. The correlation matrix also indicates no coefficient is close to the levels usually regarded as indicative of severe multicollinearity between the green banking predictors. Other regression diagnostics—such as residual normality, homoscedasticity, linearity, independence, influential observations, and model specification—were not reported in the source manuscript. The coefficients should thus be read as the outcome of the models mentioned, and it is suggested that they are subjected to a diagnostic check, prior to submission in a journal or secondary analysis.

Common-method and Perceptual-measure Considerations

Common-method variance is possible because all substantive variables were measured with the same respondents and same questionnaire. All of the following have the potential to result in common-method bias: consistency motives, social desirability, item context, acquiescence, and shared scale format (Podsakoff et al., 2003). Partly, then, the positive correlations could be explained by the method of measurement as well as by substantive relationships. The study does not do this by temporal separation nor by data sources. Further research should include employee evaluations and branch energy consumption, paper usage, digital-transaction ratio, training logs, green-loan portfolios, non-performing loans, cost-to-income ratio, and audited profitability.

The process insights gained from staff perceptions could then be compared to the objective performance outcomes in a triangulation process.

RESULTS

Respondent Profile

Of the 373 respondents, 58.7% were male and 41.3% were female. The majority of respondents (67.3%) were aged between 25 and 40, suggesting a sample of primarily early to mid-career banking professionals. In terms of education, 72.4% had a master's degree, 18.2% had a bachelor's degree, and 9.4% had other professional qualifications. The average number of years of work experience was 8.7 years. Specifically, 45.2% had 5 to 10 years experience, 32.7% less than 5 years, and 22.1% over 10 years. The profile indicates that the interviewees tended to be well educated and highly exposed to organizational activities, although the sample includes a smaller number of highly senior and long-serving employees.

Table 2. Demographic profile of respondents ($N = 373$)

Characteristic	Category	Percentage
Gender	Male	58.7
Gender	Female	41.3
Age	25-40 years	67.3
Education	Master's degree	72.4
Education	Bachelor's degree	18.2
Education	Other professional qualification	9.4
Experience	Less than 5 years	32.7
Experience	5-10 years	45.2
Experience	More than 10 years	22.1

Descriptive Statistics

Green products and services received the highest mean score ($M = 4.23$, $SD = 0.72$) and showed high consensus that digital and paperless services are already well defined attributes of the banks participating in this study. Adoption of resource-saving businesses practices was also rated well ($M = 4.12$, $SD = 0.68$), indicating visible business green strategies. The score for green investments was moderately positive ($M = 3.89$, $SD = 0.84$). The lower

mean and greater differences from GPS and GBS could be due to differences in exposure to renewable energy activities or other green finance activities among banks/respondents. The lowest mean ($M = 3.45$, $SD = 0.91$) and the highest standard deviation was for green human resource management. This pattern shows that the institutionalization of environmental training, recruitment, awareness and participation is less consistent than that of digital services and operational activities.

Among the performance dimensions, efficiency was rated highest ($M = 4.08$, $SD = 0.73$), followed by effectiveness ($M = 3.92$, $SD = 0.78$) and economy ($M = 3.76$, $SD = 0.82$). The ordering makes some sense from a content point of view. Operational changes like digital delivery, virtual meetings, and paper reduction can be seen by employees within a relatively short time period, while strategic effectiveness and cost optimization may rely on the market, regulatory and investment climate. The economy mean was higher than the neutral threshold, suggesting that respondents were not so sure that green banking had become a profitable cost and capital benefit,

Table 3
Descriptive Statistics of Study Constructs

Construct	Code	Mean	SD
Green products and services	GPS	4.23	0.72
Green investments	GI	3.89	0.84
Green business strategies	GBS	4.12	0.68
Green human resource management	GHRM	3.45	0.91
Efficiency	EF	4.08	0.73
Effectiveness	EFF	3.92	0.78
Economy	EO	3.76	0.82

Correlation Analysis

All four green banking dimensions were positively correlated with efficiency, effectiveness, and economy at the .01 level. The strongest bivariate association was between green business strategies and efficiency ($r = .678$), followed by green business strategies and effectiveness ($r = .643$), and green products and

services and efficiency ($r = .623$). These are moderate-to-strong correlations in organizational research and indicate that employees who perceived stronger operational green strategies also tended to perceive better organizational performance.

The correlations among the independent variables ranged from .398 to .567. This pattern shows that the four dimensions are related components of a broader green banking orientation but are not interchangeable. The correlation between efficiency and effectiveness was .712, indicating substantial overlap between the two performance dimensions. However, the coefficient is not so high as to demonstrate identity, and the study estimates them separately because they represent different managerial outcomes. The results provide preliminary support for all directional hypotheses at the bivariate level, but regression analysis is required to determine whether each predictor contributes uniquely when the others are held constant.

Table 4
Correlation matrix

Variable	GPS	GI	GBS	GHRM	EF	EFF	EO
GPS	1.000						
GI	.482*	1.000					
GBS	.567*	.512*	1.000				
GHRM	.398*	.445*	.491*	1.000			
EF	.623*	.521*	.678*	.456**	1.000		
EFF	.598*	.489*	.643*	.428**	.712*	1.000	
EO	.512*	.498*	.589*	.412**	.645*	.623*	1.000

Note. ** $p < .01$, two-tailed.

Multiple-regression Results

The four green banking predictors jointly explained 54.2% of the variance in efficiency ($R^2 = .542$), 51.1% of the variance in effectiveness ($R^2 = .511$), and 47.8% of the variance in economy ($R^2 = .478$). Each overall model was statistically significant at $p < .001$. The amount of explained variance is substantial for perceptual organizational research and suggests that

the selected green banking dimensions are closely connected to how employees evaluate bank performance. Nevertheless, R^2 should not be interpreted as the proportion of objective financial performance caused by green banking; it is the proportion of variance in the measured perceptions accounted for by the specified predictors within this sample.

Green business strategies were the strongest predictor in every model: efficiency ($\beta = .312$, $t = 6.234$, $p < .001$), effectiveness ($\beta = .289$, $t = 5.789$, $p < .001$), and economy ($\beta = .234$, $t = 4.678$, $p < .001$). Green products and services were the second strongest predictor of efficiency ($\beta = .245$, $t = 4.891$, $p < .001$), effectiveness ($\beta = .223$, $t = 4.456$, $p < .001$), and economy ($\beta = .198$, $t = 3.967$, $p < .001$). These results indicate that organization-wide operating practices and digital/paperless services have the most consistent unique associations with perceived performance. Green investments were significant in all three models, although their standardized coefficients were smaller: efficiency ($\beta = .156$, $t = 3.124$, $p = .002$), effectiveness ($\beta = .145$, $t = 2.901$, $p = .004$), and economy ($\beta = .167$, $t = 3.345$, $p = .001$). Green human resource management was significant for efficiency ($\beta = .112$, $t = 2.245$, $p = .025$), reached the conventional boundary for effectiveness ($\beta = .098$, $t = 1.967$, $p = .050$), and was not significant for economy ($\beta = .089$, $t = 1.789$, $p = .074$). The pattern does not support a blanket claim that every green banking dimension significantly predicts every performance outcome. Rather, it suggests that GHRM's unique short-term economic contribution is limited after operational strategy, products, and investments are considered.

VIF values ranged from 1.112 to 1.456, confirming that the instability of individual coefficients is unlikely to be driven by severe multicollinearity. Because the same VIF values apply across the three models, the predictors retain sufficient statistical distinctiveness for simultaneous interpretation. The low VIFs do not address common-method bias or omitted-variable bias, which remain separate limitations.

Table 5
 Multiple-regression results

Outcome	Predictor	B	t	p	VIF
Efficiency	GPS	.245	4.891	< .001	1.234
Efficiency	GI	.156	3.124	.002	1.189
Efficiency	GBS	.312	6.234	< .001	1.456
Efficiency	GHRM	.112	2.245	.025	1.112
Effectiveness	GPS	.223	4.456	< .001	1.234
Effectiveness	GI	.145	2.901	.004	1.189
Effectiveness	GBS	.289	5.789	< .001	1.456
Effectiveness	GHRM	.098	1.967	.050	1.112
Economy	GPS	.198	3.967	< .001	1.234
Economy	GI	.167	3.345	.001	1.189
Economy	GBS	.234	4.678	< .001	1.456
Economy	GHRM	.089	1.789	.074	1.112

Note. Efficiency model $R^2 = .542$; effectiveness model $R^2 = .511$; economy model $R^2 = .478$. All overall models $p < .001$.

Hypothesis Decisions

Table 6
 Summary of hypothesis results

Predictor	Efficiency	Effectiveness	Economy
Green products and services	Supported	Supported	Supported
Green investments	Supported	Supported	Supported
Green business strategies	Supported	Supported	Supported
Green human resource management	Supported	Borderline ($p = .050$)	Not supported

DISCUSSION

The results indicate that there is strong evidence provided that green banking is related with perceived organizational performance in the banks sampled in Nepal. The three models account for a range of 47.8% to 54.2% of the variance in efficiency, effectiveness,

and economy. This uniformity in results is significant. It indicates that green banking is not only a reputation or compliance process with no relation to the use of resources, achievement of objectives and management costs; it brings together these concepts. The findings are consistent with the published literature that says that environmental and social practices can contribute to the financial value when they create capabilities, minimize risks or enhance stakeholder relationships (Eccles et al., 2014; Friede et al., 2015; Lins et al., 2017). They also endorse the natural-resource-based view, which posits that environmental competence is valuable when it is integrated into a routine and strategic assets (Hart, 1995).

The study also does not prove that the actual perceptions of performance resulted from green banking. The reverse is also possible: Well-managed banks may be able to allocate more resources to greening and may enjoy better employee ratings for their performance. A general tendency to respond favorably to items can also overestimate associations, as all variables were assessed in the same survey. What is important in the substantive value of the results is the coherent pattern across constructs, the relative ranking importance of the predictors, and the identification of constructs which are important after the simultaneous estimation, but not a claim of a definitive causal impact.

In all three models the largest standardized coefficient was achieved by green business strategies. This is theoretically plausible as it reflects the process of integrating environmental activities within the organization, not just a product or programme. Several units and transactions can be impacted by using energy efficient lighting, waste control, virtual meetings, sustainable procedures and management procedures. They can minimize re-consumption, streamline workflows, decrease travels and make management more transparent. These programs can lead to tangible operational benefits even in the face of limited external green finance markets.

This finding aligns with research indicating that proactive environmental management can positively impact performance via efficiency, innovation and risk prevention (King & Lenox, 2001; Klassen & McLaughlin, 1996; Russo & Fouts, 1997). It also reinforces the idea that things are more difficult to emulate than public claims, because of the routine

and coordination aspects of the matter. A competitor can set up a competitor green account but it does not have the ability to copy in a single step disciplined procurement, branch energy management, integrated environmental risk controls, and management accountability. To Nepalese banks, the question is that green banking should be a transformation of the operating model and not only a responsibility of corporate affairs or CSR.

Green products and services were the second highest predictor in all models, with the highest descriptive mean. This shows that the most obvious and well-developed green banking practices among participating banks are digital and paperless services. Their close ties with efficiency are to be expected as electronic statements, mobile banking, online banking and remote service can help to cut down on the number of times customers have to visit the branch, involve manual processes, print, store and wait. This correlation with effectiveness may relate to their ability to reach and respond to services. Their link to economy implies that they are believed to have cost advantages, but the coefficient is less than for efficiency because being built on the platform, the need for cyber security, maintenance, customer support and duplicated channels could cancel out the economies.

The results are consistent with the evidence that digital channels can enhance bank performance following organizational learning and customer adoption (DeYoung, 2005; Hernando & Nieto, 2007). Scott et al. (2017) also highlight the need to embed financial technology in the institutional and network environment over time. The environmental interpretation should be contained within its own frame. Digitalisation is not inherently green, the impact will depend on the energy consumption, lifespan of equipment, the efficiency of data centres, reduced customer travel, and whether paper-based processes are being phased out or not. Banks should thus be able to quantify the use of resources at the transaction level, instead of on the basis of 'paperless'. The largest of the three coefficients for any of the performance dimensions were for green investments, though the magnitude was less than for GBS and GPS. This is in line with the practical nature of green finance. Lending to renewable energy, efficient buildings, clean technology, or resilient infrastructure can create revenue, diversify portfolios, and support

national development. Environmental appraisal can also uncover liabilities and transition risks not covered by traditional credit analysis. The previous studies have demonstrated that banks are willing to incorporate environmental information into credit analysis, and that green lending can have an impact on risk outcomes (Cui et al., 2018; Nandy & Lodh, 2012; Weber et al., 2008).

However, green investment investments are not always short term, do not have a predictable time horizon, are subject to variability in policy, and are difficult to monitor. Early-stage markets may not have a standardized taxonomy, verified project pipelines, strong collateral valuation and historical default data. These circumstances can constrain scale and increase transaction costs. Therefore, the moderate coefficients might be an indicator of a stage of capability development, and not of a weak strategic relevance. The positive economy coefficient is worth noting, since it would indicate that respondents view green investment as greater than the compliance cost. However, this study does not allow us to conclude whether this perception is a result of real interest income, a reduction in risk of default, concessional financing, or reputation. The separation of these channels in future research should be based on loan-level and portfolio data.

CONCLUSION

The finding of this study suggests a strong relationship between green banking and financial performance perceived among selected commercial banks in Nepal. Efficiency, effectiveness and economy are most reliably predicted by green business strategies and by green products and services. There is also a moderate but positive impact on green investments, but the impact of these investments is not as strong. Economy, while controlled for other dimensions, is not significantly related to green human resource management; effectiveness is marginally related; and efficiency is positively related. The pattern suggests that the early positive impacts of visible operational and digital practices could come from their performance in the short term, while the gains in employee capability are more likely to deliver measurable economic impact where there is greater depth and time.

Central to this implication is not that all environmentally labelled activities are profitable. Instead, green banking becomes valuable in terms of credibility, integration, measurability and capabilities. Digital service must be complemented with process redesign, green lending with a strict technical and credit evaluation, operation initiatives with resource-intensity indicators and employee training with authority, incentives and evaluation systems. The regulators can assist in this transition by providing clear definitions, proportionate guidance on risk, similar risk reporting, and through capability development.

Therefore, green banking for Nepalese commercial banks must be treated as a discipline-based approach to align the service innovation, risk management strategies, resource efficiency and future sustainability with environmental responsibilities. There is suggestive evidence but no causal evidence. To build a more robust next generation of research, the use of longitudinal designs, validated measures, objective financial data, and bank-level environmental data will be necessary. This work will not only indicate whether green banking is linked with improved performance, but also which practices lead to value creation, how, over what time horizon, under which institutional conditions.

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