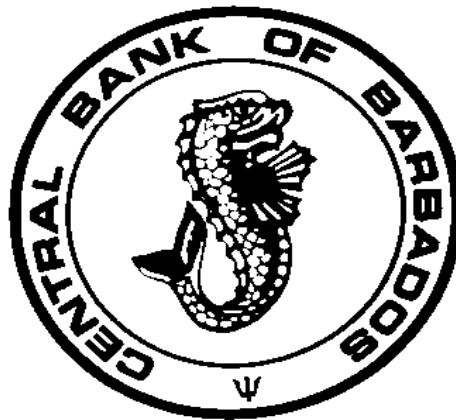


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**GREENING SMALL BUSINESSES IN SMALL STATES:
THE CASE OF BARBADOS**

BY

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Greening Small Businesses in Small States: The Case of Barbados

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Abstract

Barbados has embarked on a bold initiative to green its economy. To date, there has been significant progress in relation to some areas of the economy (e.g. energy). This paper investigates the extent to which small- and medium-sized enterprises (one of the largest segments of economic activity) in the island have adopted green initiatives and the factors that have influenced this decision. The paper estimates a probit model using a firm-level database extracted from the Compete Caribbean's Productivity, Technology and Innovation in the Caribbean (PROTEqIN) database. The results from the study suggest that small and medium-sized businesses have lagged behind larger entities in relation to adopting green strategies. One of the key constraints identified was the availability of technical skills and support within the enterprise. The paper recommends that if the island is to have any success in relation to greening small- and medium-sized enterprises, an attempt will need to be made to make access to technical support easier for these companies.

Keywords: Green economy; Small and medium-sized businesses; Probit model

JEL Codes: Q2; L2

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1 Introduction

A small business in Barbados, according to the Small Business Development Act - CAP 318C (Government of Barbados 1999), is any company with paid up capital below US\$500,000, sales of less than US\$1,000,000 and fewer than 25 employees. The definition of a small business in Barbados varies significantly from country definitions used elsewhere around the world, largely due to the relatively small size of the economy. In the United States, the definition of a small business varies by industry. In agriculture, small is defined as a business with sales of US\$750,000 or less and fewer than 500 employees, while in retail trade the sales threshold is US\$38.5 million and approximately 200 employees (US Small Business Association 2016). In Europe, the definition is somewhat simplified, with a small or micro business having 50 or fewer employees and a turnover of less than €10 million (European Commission 2016).

Despite its limitations in terms of size, Barbados has set itself the very bold objective of becoming the greenest economy in Latin America and the Caribbean (Moore, et al. 2012). If the island is to meet its targets in relation to greening the economy, small and medium-sized businesses (SMBs) will have to play a leading role. In most countries, SMBs are a key part of the economy. Barbados is no different, SMBs account for a large share of total value added, employment as well as tax revenues (Barrow and Greene 1979).

The idea of a green economy attempts to shift the debate away from a dichotomising of economic growth and environmental sustainability to one where the two are essentially complements and necessary conditions for the other. This convergence of a green economy and sustainable development is clearly seen in the various working definitions of the green economy enunciated by UNEP:

One that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP 2010a).

A green economy is a system of economic activities related to the production, distribution and consumption of goods and services that results in improved human well-being over the long term, whilst not exposing future generations to significant environmental risks and ecological scarcities (UNEP 2010b).

Most small states are also characterised by a narrow domestic production bases, i.e. they tend to focus on the production of a few goods and/or services (Charles 1997). Furthermore, the types of goods that Small Island Developing States (SIDS) export do not tend to be unique: the countries tend to export a small set of goods and services that are being produced by other countries around the world (Easterly and Kraay 2000). The green economy concept therefore provides an opportunity for these economies to not only diversify their production base but also reduce their dependence on imported inputs (e.g. fossil fuels). It is therefore not surprising therefore that many small states have been exploring options to green their economy (Smith, Halton and Strachan 2014).

This paper investigates the extent to which Barbadian companies have adopted green initiatives and the factors that have influenced this decision. The paper contributes to the literature in three main ways. First, it provides an assessment of the extent of greening of firms in Barbados. Second, using a model of Probit model of the decision to adopt green initiatives, the paper also offers an assessment of the main determinants of the decision to green these business. Finally, the paper also makes some recommendations to enhance support for greening in the economy, most of which would be relevant to other small island developing economies.

The remainder of this paper is structured as follows. After the introduction, Section 2 provides a brief summary of the previous literature on greening small businesses. Section 3 of the study then gives an assessment of the green initiatives available in Barbados to assist small businesses. Section 4 attempts to explain the factors that influence firms in Barbados to adopt green initiatives while Section 5 discusses some recommendations to increase the adoption of green business practices by SMBs. Section 6 of the paper concludes with a summary of the main results as well as policy recommendations.

2 Literature Review

The goal of greening small businesses is related to the broad literature on corporate social responsibility of small firms. Given the close linkages between small businesses and the community, Besser (1999) argues that small businesses should have a greater incentive to make decisions aligned with the best interest of its community. Small

business owner-managers, however, often cite lack of time and resources as key constraints to their environmental behaviour as well as community involvement and the perception of miniscule gains from such activities (Hitchens, et al. 2005, Tilley 1999). This section of the report provides a summary of the key factors that have been found to influence the environmental awareness of small businesses and/or willingness to green their operations.

2.1 *Small Business and Greening*

Individually, small businesses have a very small environmental footprint. Many of these entities may not be affected by environmental legislation and/or may believe that because their environmental footprint is small do not consider environmental management activities and practices as important. Gadenne, Kennedy and McKeiver (2009) therefore examine the internal and external factors that impact on the environmental awareness of firms. Contrary to a priori expectations, the study finds that many SMBs are very aware of their environmental impact and the benefit that sustainable practices can have for business in the future. Despite this high level of awareness, however, only a few of these businesses had actually implemented proactive environmentally sustainable practices, mainly due to the cost attached to adopting such green practices.

SMBs also tend not to implement green processes when there are weaknesses in their strategic characteristics. Aragon-Correa et al. (2008) finds that those SMBs that have unique strategic characteristics: shorter lines of communication and more interaction, a founding vision, flexible external relationships as well as an entrepreneurial orientation are more likely to adopt green processes. Moreover, those firms that adopted innovative environmental practices tend to have superior financial performance. This finding suggests that while the upfront costs of greening might be prohibitive, the long run benefits for most firms is quite significant.

Buyer requirements can also be an important determinant of whether or not small businesses adopt green initiatives. For example, small businesses that are part of a global supply chain may encounter pressures from other firms to adopt greener and more sustainable businesses practices in order to enhance product quality, marketing

and reduce cost. Lee (2008), using a database of 855 Korean SMBs as well as hierarchical linear regression analysis, investigates the willingness of suppliers to participate in green supply chain initiatives. The study reports that buyer environmental requirements were a key determinant of the decision to adopt green strategies and practices. In addition, factors such as government involvement and supplier readiness to adopt green practices were important determinants of the decision to adopt green business practices. Tzschentke et al. (2008) also noted the importance of consumer demands in the case of small hospitality firms, but also identified the significance of the personal, socio-cultural and situational factors of the organisation.

Many owner-managers of small businesses are also aware of the potential cost savings that might accrue to the company from greening their operations. Cost savings can arise through recycling, energy saving as well as shipping. Revell et al. (2010) notes that the results from a cross-sector survey of 220 UK SMBs suggests that these companies are motivated to adopt green practices, not only because of regulations, but also due to the likelihood of cost savings, attracting new customers, recruitment as well as publicity. In addition, companies noted that the transition to a low-carbon economy create business opportunities that might be good for business. Conducting in-depth interviews of SMBs in the electronics industry, Lee (2009) also finds that many SMBs cite the potential cost savings from greening their businesses. However, the author suggests these organisations can also green their businesses by making strategic and organisational changes.

2.2 Regulations and Green Practices by Businesses

Regulations tend to be a key driver of greening by SMBs. As it relates to the company's day-to-day processes, regulations can hinder or prevent the operations of the firm in question due to their environmental performance (Delmas and Toffel 2004). Hoogendoorn, Guerra and van der Zwan (2015), using a database of 8000 SMBs from 12 industries and 36 countries, investigate the factors that drive these companies to engage in environmental practices. Two measures of greening are used: (1) investments in resource efficiency as a percentage of annual turnover to capture engagement in greening processes; and, (2) percentage sales of green products and services as a

measure of green product and service offerings. Applying an ordered Logit model, Hoogendoorn, Guerra and van der Zwan report that there appears to be a U-shaped relationship between the process of greening and firm size, with medium-sized SMBs (in terms of employees and turnover) being more likely to engaged in green production and services. Overall, however, small enterprises were less likely to be involved in any type of greening. In addition to firm size, Hoogendoorn, Guerra and van der Zwan find that business-to-business companies as well as companies that operate in industries with weak environmental regulation were also least likely to engage in green practices.

In addition to environmental regulations, incentives have also been identified as a useful policy intervention to encourage firms to adopt green business practices. While the case for going green seems relatively clear for small businesses, given the technical and resource demands of greening, the benefits of greening for small firms is somewhat ambiguous. Clemens (2006), however, finds that green economic incentives not only encourages firms to green their businesses, but also have a positive impact on financial performance of small firms. Given the benefits of these incentives for the business as well as for the environment, such incentives seem to present a win-win for policymakers. Nevertheless, Zee et al. (2002) recommends that these tax incentives should be directed mainly at the faster recovery of investment costs if they are to lead to tangible results.

Regulatory and cost saving motivations can also be powerful potential motivations behind the attempts of firms to green their businesses. These motivations might be ethical, competitive or relational. Gonzalez-Benito et al. (2005) assesses the decision of 184 Spanish manufacturers to pursue ISO14001 certification. The results reported in the study suggests that these companies show a high level of environmental awareness as well as commitment and are more likely to believe that better environmental management would result in competitive advantages. There was, however, no evidence to suggest that they pursued environmental certification to enhance their relationships with other institutions and groupings.

Besides regulations, consumer demands can heavily influence the decisions of firms to pursue green business practices (Doran and Ryan 2012). Doran and Ryan estimate a modified innovation production function to evaluate the impact of regulation, consumer expectations and voluntary agreements on the likelihood of eco-innovation. In line with

previous research, regulations along with customer perceptions were a key driver of a firm's decision to engage in eco-innovation. Given the positive relationship between eco-innovation and firm profitability, these findings indicate that regulators can not only enhance the growth of these enterprises through green regulations but also improve social welfare.

2.3 *Green Practices and Firm Performance*

In more developed economies, small firms have adopted a range of environmental strategies, mainly in response to regulatory demands, and have obtained benefits from such innovations. Aragon-Correa et al. (2008) examines the case of 108 small- and medium-sized automotive repair companies in Southern Spain. The authors find that, in agreement with a priori expectations, most SMBs tend to be reactive in relation to environmental practices. However, those firms that did have a more proactive approach outperformed their peers. Aragon-Correa et al. also note that these more proactive companies usually had shorter lines of communication, a strong vision from the founder, flexibility in relation to external relationships as well as an entrepreneurial orientation.

The benefits of greening, reflected by environmental certification are particularly strong in some industries (for example tourism). Peiro-Signes et al. (2012) examines the comparative economic performance of Spanish hotels that have adopted environmental standards (ISO14001). Using a database of 2,116 hotels and various measures of economic performance, the study finds that achieving ISO14001 certification is normally associated with improved economic performance. However, size had a significant impact on the benefits obtained, with larger hotels reporting comparatively greater economic benefits. These results could suggest that small firms might not have access to the team of specialists required to fully leverage the benefits of certification that a larger business might have. As a result, having an appropriate team of skilled persons when adopting green standards appears to be an important aspect of leveraging the full benefits of greening for small businesses.

Testing for the differences in motivational indicators such as corporate environmental strategy and green practices, Paulraj (2009) report that the company's strategy

compared to their competitors along environmental legislation and corporate environmental responsibility pushed companies to incorporate green business practices. These practices tend to reduce the cost of inputs and disposal of waste, while minimizing their impact on the environment (Cordano 1993).

3 Options for Promoting Green Business Practices in Barbados

In order for a small open economy, such as Barbados, to promote green initiatives among businesses, green finance opportunities must be created. Green financing involves both investing and providing market finance to SMBs that are pursuing green business activities (Moore, et al. 2012). Green finance can cover car loans for solar or electric vehicles, house mortgages, installation of solar panels, and environmental bonds among other things.

There are several other financing avenues that the Government of Barbados (GOB) can use to provide finance to SMBs to support green projects and activities. The GOB, for example, can enter a Public-Private-Partnership (PPP) with the SMBs (Elsig and Amalric 2008). These are essentially long-term contractual agreements between the private developer and government where the objectives of the government are aligned to the profit-driven goals of the developer. In these arrangements, the public sector may provide the financing, while the private sector operates the initiative and pays some leasing cost to government that is then used to service the debt contracted by government to finance the project.

Financing can also be provided by the public sector through Energy Performance Contracting (EPC) agreements (Xu, Chan and Qian 2011). EPCs are a turnkey relationship that has similar set-up to a PPP, but instead are used for energy efficiency projects. In most cases, this arrangement is accompanied with energy saving guarantees that will help to fully finance the project.

Another medium of financing is through government financed grants and low cost loans. Such an approach has already been implemented through the establishment of Sustainable Energy Investment Programme (Energy SMART Fund). Through this fund, the GOB provides a mechanism where businesses can access both financial and

technical support for both renewable energy and energy efficiency projects (Division of Energy 2016). This fund was capitalised by Government through a loan of US\$10 million from the Inter-American Development Bank (IDB). Besides providing subsidised loans, grants are offered for assessing both the technical and financial feasibility of these projects.

Green initiatives in the private sector are also supported through the use of fiscal incentives (BIDC 2011). Over the years, the GOB has tended to use both green subsidies and environmental taxes as part of its fiscal strategy. Some of these incentives include:

- energy conservation and renewable energy deductions of US\$12,500 for SMBs;
- a tax rebate of up to a maximum of US \$2,500 to farmers who retrofit structures to house livestock with solar energy; and,
- the ability to write-off up to 150 percent of the total cost associated with businesses converting to alternative energy over a five-year period.

In addition, to the mechanisms above, businesses that provide residential energy audits can claim what is called an “Energy Conservation and Renewable Energy Deduction Allowance” (BIDC 2011). The claim can be up to, but not exceeding, US\$2,500 per year over each of five years to cover cost of an energy audit, and 50 percent of the expenses incurred in either the installation of an energy system to produce electrical energy from a source other than fossil fuels or retrofitting a residence or building structure. The island has also reduced import duties payable on materials that promote energy efficiency. Materials such as thermal barriers, window tint, ceramic roof coatings and roof insulation are classified as “energy efficient systems/components” and import duty on these items have been reduced from 20 percent to just 5 percent.

4 Decision to Adopt Green Business Practices

The data used in this paper is taken from the Compete Caribbean Productivity, Technology and Innovation in the Caribbean (PROTEqIN¹) database (Compete Caribbean 2015). The database contains information on 150 Barbadian firms in both the manufacturing and services industries. The sampling was done using a stratified random sampling approach and therefore provides a representative sample of the establishments in the country. In the case of Barbados, 49 of the 150 enterprises were considered small, 62 medium-sized and the remainder (39) were considered large enterprises.

The previous section of the study noted that there exist many programmes to promote greening in Barbados. The survey database tackles two aspects of greening: (1) environmental impact; and, (2) reduced energy costs. In the survey, companies were asked to indicate if they had undertaken any initiatives to reduce their environmental impact or if they had adopted any strategies to reduce the energy costs. These two variables were combined to produce a single dummy variable indicator that takes a value of 1 if the company had undertaken any strategies to reduce its environmental impact or energy cost.

In general, SMBs are less likely to pursue green initiatives in Barbados. Table 1 disaggregates the companies in the database by the number of

Table 1: Greening and Company Size

Number of Employees	Number of Companies Pursuing Green Initiatives	Total Number of Companies	Ratio
0-20	0	45	0%
21-40	14	27	52%
41-60	4	11	36%
61-80	3	5	60%
81-100	2	2	100%
101-120	4	11	36%
121-140	5	9	56%
141-160	1	4	25%
More than 160	2	9	22%

Source: Compete Caribbean (PROTEqIN) database

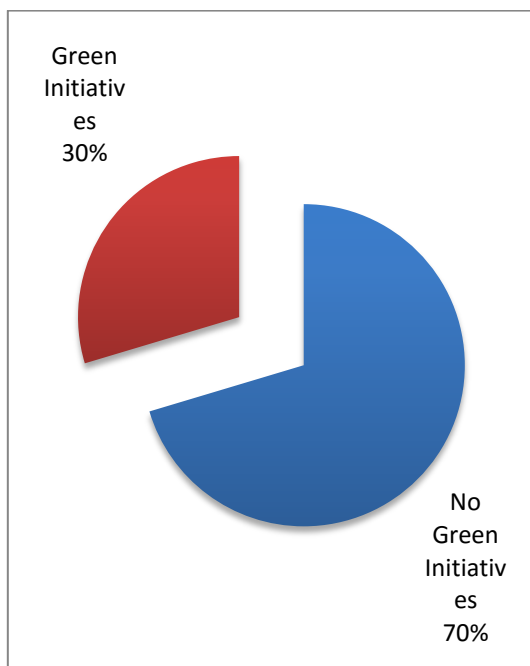
¹ <http://competecaribbean.org/proteqin/>

employees as well the number pursuing initiatives to green their business. Of the 45 companies employing 20 persons or less, none had pursued any initiatives to green their operations. However, for the remainder of the 78 companies (i.e. those employing 21 persons or more) 45 percent were attempting to green their business. This is a fairly high ratio for larger enterprises, but the relatively poor performance of SMBs in pursuing green initiatives suggests that there is still some potential to green the corporate sector in Barbados.

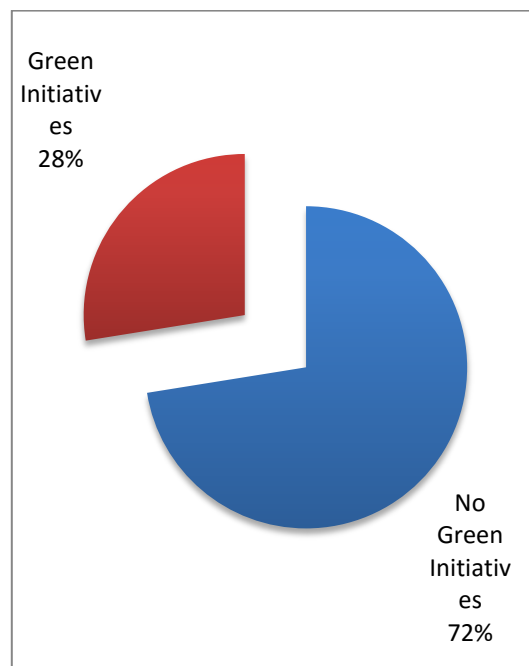
On average, manufacturing and service companies had roughly the same likelihood of pursuing green initiatives: one-third of companies in the services and manufacturing industries were pursuing initiatives to green the enterprise (Figure 1). In contrast, 123 companies attempting to green their enterprise, one-fifth had a website and almost 10 percent had engaged in research and development, either to develop new products or reduce costs (Figure 3). Sarkis (2003) notes that many of these companies tend to integrate environmental plans as a means of gaining a competitive advantage over rivals.

Figure 1: Proportion of Companies Pursuing Green Initiatives by Industry

Manufacturing



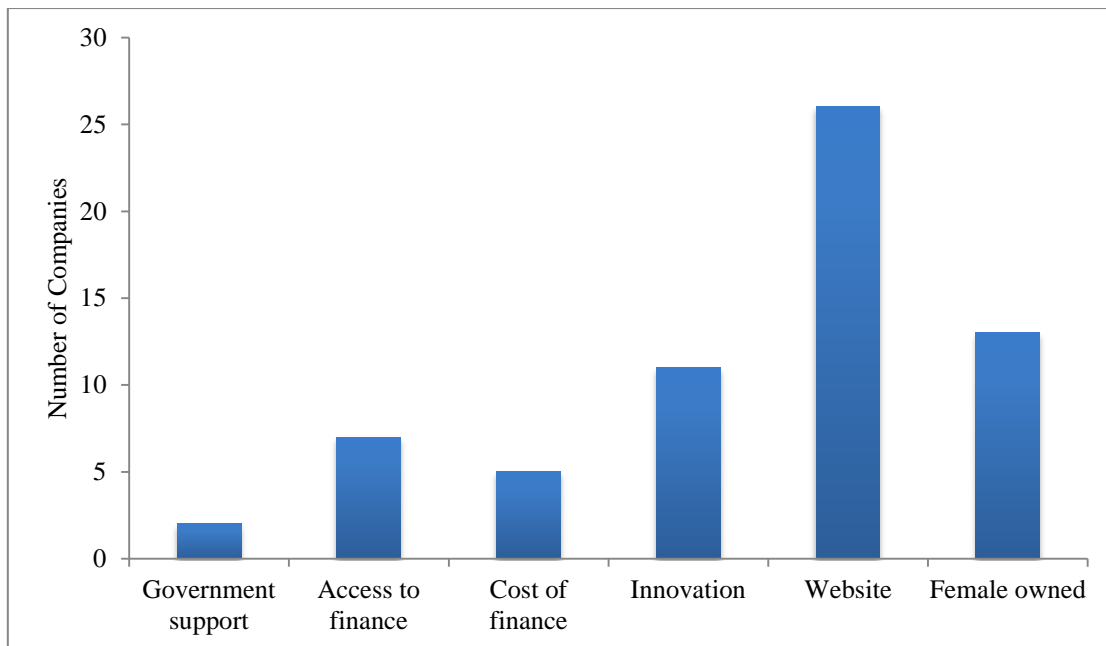
Services



Source: Compete Caribbean PROTEqIN database

In addition to the importance of technological variables, the results reported in Figure 2 also suggest that female-owned enterprises were less likely to pursue green business initiatives. This finding could be associated with many factors, not just a difference in the decision-making of female owners. Carter and Allen (1997), for example, argue that the characteristics of female-owned businesses is largely conditional on the business have access to financial resources. This finding is also inconsistent with the literature which normally reports that females are willing to pay more for environmentally friendly products (Laroche, Bergeron and Barbaro-Forleo 2001), as well as other previous studies examining the issue of green purchasing (Schaper 2002). There is some evidence of financing constraints limiting the ability of firms to pursue green initiatives, with only a small number of companies identifying the “high cost of finance” or lack “access to finance” as a key obstacle to pursuing initiatives to reduce their environmental impact.

Figure 2: Number of Companies Adopting Green Initiatives



Source: Compete Caribbean PROTEqIN database

One of the shortcomings of using descriptive statistics to draw inferences about a particular sample group is the potential effect of “third” variables that are not accounted for in bivariate analyses. To address this shortcoming, the study also estimates a Probit regression of the decision to adopt green business practices. This approach is approach when the dependent variable is dichotomous, i.e. has only two values (Cameron and Trivedi 2006). In the case of our model, whether the firm pursued some type of green initiative or not. Let p_i be an indicator of whether the firm pursued some type of green initiative, the Probit model takes the form:

$$p_i = \Pr[y_i = 1 | \mathbf{x}] = \Phi(\mathbf{x}'_i \beta) \quad (1)$$

where $y_i = 1$ when the firm pursues some type of green initiative, $\Phi(\cdot)$ is the cumulative distribution function of a normal distribution, β are coefficient vectors, \mathbf{x}_i is a vector of possible explanatory variables. Assuming that the errors from the model are i.i.d normal variables with zero mean, the model is estimated using maximum likelihood estimation techniques.

Based on the literature highlighted in Section 2, the explanatory variables used included firm size (measured by the number of employees), participation in export markets, foreign ownership participation, foreign buyers, part of a larger entity, access to finance, proportion of highly skilled employees, degree of market competition, along with industry dummies (see Table 2).

Table 2: Expected sigs for Explanatory Variables

Variables	Potential Sign	Literature
Firm size	-	Aragon-Correa et al. (2008); Peiro-Signes et al. (2012); Hoogendoorn, Guerra and van der Zwan (2015)
Participation in export markets	+	Lee (2008)
Foreign ownership and participation	+/-	Lee (2008)
Foreign buyers	+/-	Lee (2008); Tzschentke et al. (2008)
Supply chain	+	Lee (2008); Tzschentke et al. (2008)
Access to finance	-	Aragon-Correa et al. (2008)
Skilled employees	+	Peiro-Signes et al. (2012)
Market competition	+	Paulraj (2009)
Industry dummies	+/-	Hoogendoorn, Guerra and

		van der Zwan (2015)
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Clemens (2006) and Aragon-Correa et al. (2008) both argue that firm performance should improve due to the adoption of green initiatives, as undertaking of proactive environmental practices enhances the competitiveness of small firms. Suppliers that pursue ISO 14001 or EMAS certification tend to be more competitive internationally, regardless of size (Bellesi, Lehrer and Tal 2005). When a company receives ISO14001 certification, this demonstrates that the firm operates at the highest international standard, reducing costs by having in place waste management systems, an advantage in marketing and reduction in both risks and costs of litigation.

Corporate greening initiatives taken on by an enterprise tend to have an effect on the investor's perception of company's performance in the future (Gilley, Worrell and El-Jelly 2000). Investors more react to product-driven green initiatives than those of process-driven green initiatives. Interestingly enough, an introduction of new green products by a firm will increase the overall reputation of the business, but at the same time increase sales of the goods. Additionally, (M. K. Gilley, et al. 2000) conclude that the stock market responds positively to green initiatives undertaken by these firms. In terms of the explanatory variable of access to financing, (Haselip, Desgain and Mackenzie 2014) show that the lack of finance from financial institutions such as banks was a major barrier to the commercial viability of the SMBs energy sector in Ghana and Senegal. This finding is similar to the study by (Kauffman 2005) where SMBs in Africa have very limited access to finance, because of the high risk of default on loans and a lack of financial facilities.

The results of the regression analysis are reported in

Table 3. Column 2 provides the results from estimating the empirical model using OLS (also known as the Linear Probability Model) while Columns 3 and 4 provide the results from the Probit model and the associated marginal effects of a change in each regressor on the probability that the dependent variable takes a value of 1 (pursuing green initiatives) and evaluated using the sample means. The model estimated using OLS is provided for comparison

Table 3: Determinants of the Adoption of Green Business Practices in Barbados

	OLS	Probit	Marginal Effects of Probit regression
Age	0.003 (0.007)	0.011 (0.026)	0.002 (0.005)
Age squared	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Employment	0.002 (0.002)	0.049 (0.017)***	0.009 (0.002)***
Employment squared	-0.000 (0.000)	-0.000 (0.000)***	-0.000 (0.000)***
Services	-0.040 (0.114)	-0.294 (0.559)	-0.055 (0.104)
Subsidiary	-0.136 (0.148)	-0.399 (0.500)	-0.075 (0.092)
Corporation	-0.204 (0.106)*	-0.958 (0.531)*	-0.179 (0.099)*
Sole proprietorship	-0.262 (0.105)**	-1.769 (0.682)***	-0.331 (0.124)***
Foreign owned	-0.000 (0.002)	-0.003 (0.006)	-0.001 (0.002)
Female owned	0.140 (0.089)	0.603 (0.332)*	0.113 (0.061)
Female managed	-0.165 (0.089)*	-1.000 (0.777)	-0.187 (0.146)
Website	0.093 (0.095)	0.183 (0.439)	0.034 (0.082)
Customers - individuals	-0.339 (0.185)*	-2.611 (0.869)***	-0.489 (0.145)***
Customers – small businesses	-0.322 (0.191)*	-2.203 (0.802)***	-0.413 (0.137)***
Number of competitors	0.080 (0.106)	0.493 (0.506)	0.092 (0.092)
Innovation	0.093 (0.152)	0.572 (0.524)	0.107 (0.099)
Technical employees	1.825 (1.146)	16.430 (6.884)**	3.077 (1.185)***
Access to skilled employees	-0.144 (0.074)	-0.469 (0.356)	-0.088 (0.065)
Cost of finance	-0.072 (0.122)	-0.528 (0.469)	-0.099 (0.088)
Access to finance	-0.067 (0.116)	-0.159 (0.434)	-0.030 (0.081)
Government support	-0.114 (0.170)	-0.182 (0.780)	-0.034 (0.146)
Awareness of programmes	-0.198 (0.098)**	-1.052 (0.409)***	-0.197 (0.071)***
Technical assistance	0.024 (0.123)	0.123 (0.530)	0.023 (0.099)
Intercept	0.373 (0.502)	-1.483 (2.341)	-
R-squared/pseudo R-squared	0.329	0.429	
F(23,91) or Wald Chi-square (23)	2.990 [0.000]	47.280 [0.000]	
Observations	116	116	

Notes: (1) standard errors are provided in parentheses and p-values in square brackets below coefficients.

(2) ***, ** and * indicates statistical significance at the 1, 5 and 10 percent level of testing.

purposes only, as the OLS estimator might lead to predicted probabilities greater than one (Cameron and Trivedi 2006).

The empirical model is able to explain about 43 percent more of the variation in the dependent variable than a model with just a constant (as indicated by the pseudo R-squared). In addition, the statistical significance of the Chi-square statistic suggests that all the slopes cannot be set to zero. Classification tests conducted also suggest that the model does an adequate job of classifying companies into those that do and those that do not pursue green initiatives: correctly classifying 83 percent of the companies in the database.

Given that the model does an adequate job of explaining the decision to adopt green initiatives, one can then utilise the model to identify the most important covariates and their impact on the greening decision. The covariates that were significant at normal levels of testing included company size (proxied by employment), ownership structure, customer characteristics, composition of employees and awareness of technical assistance or programmes to support greening.

In line with previous literature (Hitchens, et al. 2005, Tilley 1999), the marginal effect of the size variable suggests that larger companies are more likely to green their enterprises. To evaluate the possibility of a non-linear relationship between size and greening, the size squared term was also included to account for the likelihood that very large firms might find it too expensive to green their operations. For both the size and the size-squared term, however, the marginal effects of these variables were quite small.

The effects of size might also be reflected in the coefficient on the ownership dummy for sole proprietorships. In the sample, sole proprietorships were 30 percent less likely to engage in initiatives to green their enterprise. Many factors are normally associated with the limited decision-making space of small businesses including liquidity constraints (Holtz-Eakin, Joulfaian and Rosen 1994) as well as economies of scale and differences in organisational structure (Variyam and Kraybill 1993). One of the other difficulties that sole proprietorships may face relates to the limits on the time of the owner, which may reduce their ability to leverage incentives that may exist for the adoption of green initiatives and plan effectively (Gaskill, Van Auken and Kim 2015).

In line with the literature reported earlier, the type of consumer and business interactions were key predictors of whether or not a firm would engage in initiatives to green its enterprise. On average, companies whose main customer was either individuals or small businesses were 40 percent less likely to engage in initiatives to green their business. This finding is in line with that of Lee (2008) who finds that global supply chains tend to be a more important driver of green initiatives. This result also suggests that policymakers in the island might want to intervene by educating the public of the societal benefits of purchasing goods from companies with green credentials. Such initiatives might enhance the performance of those companies that have greened their business or product and could provide a greater incentive for other companies, once they have the resources and skills, to also consider greening their business.

Companies with a greater proportion of technical employees were significantly more likely to pursue green initiatives than their peers. Reducing a company's environmental footprint is normally done by streamlining business practices and/or technological improvements. A greater proportion of technical employees make it easier for companies to not only identify bottlenecks in the production process, but also identify and implement potential solutions (Murillo-Luna, Garces-Ayerbe and Rivera-Torres 2011). Companies with a greater proportion of technical employees were three times more likely to be pursuing green initiatives than their peers. Given the potential benefit of greening identified earlier in terms of improved firm performance, it is clear that these employees are generating a significant return on investment for those companies that make use of their skills.

Similar to Gadenne, Kennedy and McKeiver (2009) this study also finds that many businesses are aware of facilities to provide technical assistance. Given the relatively low adoption rate of some SMBs, this therefore implies that these companies do not see the benefit of utilising such assistance to green their enterprise. To ensure more businesses utilise green business strategies, it might be necessary to provide more targeted technical assistance aimed at addressing this issue.

5 Discussion on Further Institutional Mechanisms Required to Support Greening

While the magnitude of the size coefficient was relatively small, the empirical results provided earlier suggests that the constraints posed by size are still a significant hurdle as it relate to greening businesses in Barbados. Overcoming this obstacle will therefore be a key factor if policymakers are to achieve their targets in relation to the green economy, particularly given the important role played by small businesses in the domestic economy. Given the resource constraints encountered by smallest businesses it is important that these initiatives be simple, relatively easy to implement and cognizant of the time constraints of the owners of these enterprises.

One potential approach that might prove useful it to utilise existing networks (Preisendorfer and Bruderl 1998). Encouraging small business owners to network can allow them to share knowledge and information, discuss alternative approaches to greening their business and possibly exploiting green market opportunities. These networks already exist in the island through the Small Business Association, the Coalition of Service Industries and the Barbados Chamber of Commerce. Encouraging small businesses to utilise these channels to network and share knowledge about greening their business might be a low hanging fruit that could be easily supported by both the private and public sector.

One of the most important drivers of the adoption of green strategies among Barbadian businesses was the technical composition of the employees at the firm. Companies with a greater complement of technical employees were more likely to adopt green initiatives. This finding speaks to the importance of providing training opportunities as well as the role of educational institutions. Policymakers could achieve significant gains by supporting the growth and proliferation of training opportunities of employees in relation to the green economy. This would enable employees to not only support the implementation of green initiative at their company, but the industry as a whole as these employees move from job to job.

Educational institutions in Barbados might want to consider introducing courses or programmes specifically targeted at greening enterprises and exposing students in various disciplines to the concept. This would ensure that new employees coming into

the enterprise would be sufficiently versed in green economy concepts and able to support further greening of the business. While Perron, Cote and Duffy (2006) acknowledge the importance of employee awareness of green initiatives, the authors also argue that organisations should evaluate the efficiency of their training investment to ensure that the anticipated benefits are indeed being generated.

6 Conclusions

The green economy or greening the economy has become a key objective of policymakers in Barbados. To date, many of these initiatives have targeted the issue of reducing the island's dependence on fossil fuels. Given the importance of small businesses, however, this paper argues that any attempts at greening the economy would need to enhance the propensity of SMBs to green their businesses given the importance of these entities to the domestic economy. The paper therefore provides a review of current incentives aimed at supporting the greening in small businesses as well as identifies the key determinants of the propensity of these businesses to adopt green business strategies.

Although small businesses face difficulty in terms of implementing greening processes due to size, the GOB has provided many tax incentives along with access to funding such as the Energy Smart Fund. With organizations such as BREAA (Barbados Renewable Energy Association) along with other associations, firms have various networks where they can share information on cost effective and efficient models of greening within their day-to-day processes, or even current products to be greener. For future work, the authors would like to widen the study to determine if financial performance is positively associated with innovations in greening by SMBs within Barbados.

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