Ecopreneurship in Textile Innovation: Eco-Printing as a Pathway to Green Enterprise

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Abstract: *The demand for sustainable textiles has encouraged researchers and small producers to look for methods that reduce environmental harm without losing commercial value. Eco-printing, which uses plant materials to transfer colour and pattern directly onto fabric, offers one such possibility. This study explored whether eco-printing could support the development of green and circular textile enterprises by examining the technique itself, consumer responses, and people's willingness to start eco-printing-based businesses.A mixed-method approach was used. First, eco-printed textile samples were developed using locally available plant materials and natural-fibre fabrics. These samples were then assessed for colour intensity, clarity of motifs, aesthetic appeal, colour fastness, and overall acceptability. In the second stage, 150 respondents completed a structured questionnaire covering perceived sustainability, product value, technical feasibility, market opportunity, entrepreneurial self-efficacy, and ecopreneurial intention.Respondents viewed the eco-printed products positively. Product uniqueness received the highest mean score ($M = 4.31$, $SD = 0.66$), followed by aesthetic appeal ($M = 4.25$, $SD = 0.63$). There were meaningful differences between plant materials in overall product evaluation, $F(4, 745) = 13.84$, $p < 0.001$. Entrepreneurial self-efficacy showed the strongest relationship with ecopreneurial intention ($r = 0.68$, $p < 0.001$). The regression model was significant, $F(5, 144) = 38.72$, $p < 0.001$, and explained 57.3% of the variation in ecopreneurial intention.Overall, the study suggests that eco-printing can be more than a craft activity. When combined with textile waste utilisation, product development, quality control, and business training, it may become a practical route towards small-scale green enterprises.*

Keywords: Eco-printing; ecopreneurship; sustainable textiles; plant-transfer printing; circular economy; textile waste; green enterprise; entrepreneurial intention; natural colourants; textile innovation

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Introduction

The textile and apparel industry supports trade and employment across the world, but it also places heavy pressure on natural resources. Large quantities of water, energy, and chemicals are used in production, while waste generation remains a serious concern (Uddin et al., 2022). As environmental awareness has grown, both researchers and practitioners have begun looking for alternatives that are ecologically responsible yet economically realistic.

Eco-printing is one such alternative. It is a plant-transfer technique in which pigments and natural patterns from leaves, flowers, bark, or other plant materials are transferred directly onto fabric. Unlike conventional dyeing, the process produces designs that are rarely identical from one piece to another. This natural variation is often seen as a limitation in industrial textile production, but in eco-printing it becomes part of the product's appeal (Sabaric et al., 2024).

The technique also fits well with circular-economy thinking. Fabric remnants and textile waste that might otherwise be discarded can be given a new purpose through eco-printing. Instead of simply extending the life of unused material, the process can turn it into a distinctive value-added product. This reduces reliance on synthetic dyes and makes use of locally available plant resources, which is particularly useful for small-scale producers (Uddin et al., 2022).

Eco-printing also has entrepreneurial possibilities. Ecopreneurship refers to business activity that creates value while giving attention to environmental concerns. For micro-enterprises, eco-printing may offer a way to combine handcrafted production, local resources, and design innovation. Consumers who are increasingly interested in sustainable products may respond well to textiles that are natural, unique, and locally made (Uddin et al., 2022).

Still, moving from a craft technique to a viable business is not automatic. A person may appreciate the environmental value of eco-printing but still hesitate to start an enterprise. Technical confidence, consumer acceptance, market access, pricing, and belief in one's own entrepreneurial ability all matter. People who feel capable of managing a business are more likely to turn an interest in eco-printing into an income-generating activity (Sabaric et al., 2024). This study therefore examined eco-printing as a possible pathway to green enterprise. It combined practical textile experimentation with consumer evaluation and an assessment of ecopreneurial intention. The aim was to understand not only whether eco-printed products are appealing, but also what factors encourage people to consider eco-printing as a business opportunity.

Aim

To assess the potential of eco-printing as a sustainable textile innovation and examine its feasibility as a pathway for developing green and circular enterprises.

Objectives

1. To develop eco-printed textile products using selected locally available plant materials and natural-fibre fabrics.

2. To evaluate the colour intensity, motif clarity, aesthetic appeal, uniqueness, colour fastness, and overall acceptability of the developed textiles.
3. To understand consumer perceptions of the environmental value, appearance, quality, uniqueness, and market value of eco-printed products.
4. To examine perceived technical feasibility and market opportunity for eco-printing as a small-scale textile enterprise.
5. To assess entrepreneurial self-efficacy and ecopreneurial intention among respondents.
6. To study the relationship between environmental sustainability, product value, technical feasibility, market opportunity, entrepreneurial self-efficacy, and ecopreneurial intention.
7. To identify the main predictors of ecopreneurial intention using suitable statistical analysis.
8. To estimate production cost, contribution margin, and break-even quantity for a representative eco-printed product.
9. To propose an integrated ecopreneurship model linking eco-printing, textile waste use, sustainable product development, and green enterprise creation.

Methodology

Research Design

This study used a mixed-method design that combined experimental textile development with a quantitative survey. The experimental part focused on preparing and evaluating eco-printed samples, while the survey examined how consumers perceived these products and whether they felt eco-printing could become a business activity.

The work was carried out in four stages. First, textile and plant materials were selected and prepared. Second, eco-printed samples were developed and evaluated. Third, consumers assessed the finished samples. Finally, ecopreneurial intention and the factors influencing it were measured.

Study Setting and Participants

The study was conducted in Ernakulam District, Kerala, India, between February and November 2024. The experimental work was completed under controlled laboratory conditions. The survey included adults aged 18 years and above who had directly viewed the eco-printed textile samples.A purposive sampling approach produced 150 valid responses. Participants were included if they were willing to take part, could understand the questionnaire, and had seen the developed samples. Those who did not give consent or submitted incomplete responses were excluded.

Experimental Procedures

Textile Substrates

Natural-fibre fabrics were selected because they respond well to plant-transfer printing. Cotton, silk, and upcycled cotton remnants were cut into standard 20 × 20 cm samples. Each sample was pre-washed to remove finishes, dirt, or other substances that could interfere with printing.

Plant Materials

Five locally available plant materials were chosen based on their colour potential, easy availability, and relevance to small-scale production: Eucalyptus spp., guava (Psidium

guajava), mango (Mangifera indica), Hibiscus spp., and Bougainvillea spp. The plant materials were collected without damaging the source plants, cleaned, and weighed so that a 1:1 plant-to-fabric ratio was maintained.

Eco-Printing Process

Plant materials were arranged on the fabric surface, rolled or bundled tightly, and steamed at 90–100°C for 60–120 minutes. After cooling, the bundles were opened, plant residues were removed, and the textiles were air-dried. Each plant material was tested three times to allow comparison between batches.

Evaluation of Textile Samples

Sensory Evaluation : Respondents rated the samples for colour intensity, motif clarity, aesthetic appeal, originality, uniqueness, perceived quality, and overall acceptability. A five-point Likert scale was used, where 1 indicated "very poor" and 5 indicated "excellent."

Instrumental Colour Analysis: Where facilities allowed, colour values were measured using the CIELAB system (L, a, b). Colour difference (ΔE) was calculated before and after washing to understand changes in appearance.

Colour Fastness: Wash fastness, dry rubbing, and wet rubbing were assessed using standard grey-scale procedures. These tests helped identify which plant materials produced more durable prints.

Resource Use and Product Development: Water, energy, plant material, mordant, labour time, and textile waste used in each batch were recorded. This information helped build a basic environmental and economic profile of the process. Based on quality, fastness, and market potential, selected textiles were converted into products such as scarves, bags, cushion covers, table accessories, and wall décor.

Survey Instrument: The questionnaire had three sections. The first measured perceptions of eco-printed products, including environmental sustainability, uniqueness, aesthetic appeal, quality, product value, and purchase intention. The second measured ecopreneurship-related factors: technical feasibility, market opportunity, entrepreneurial self-efficacy, and ecopreneurial intention. All items used a five-point Likert scale.Experts in textile science, sustainable design, and entrepreneurship reviewed the instrument. A pilot test with 20 respondents confirmed that the questions were clear and internally consistent, with Cronbach's alpha values of 0.70 or above.

Economic Analysis: Production costs included fabric, plant material, mordant, labour, energy, water, finishing, packaging, and overhead expenses. From these figures, unit production cost, contribution margin, and break-even quantity were calculated using standard cost-accounting methods.

Statistical Analysis: The data were analysed using IBM SPSS Statistics. Means, standard deviations, and frequencies were used to describe participant characteristics and product

evaluations. Cronbach's alpha was used to check reliability. Pearson's correlation examined relationships among the main variables. Independent-samples t-tests compared respondents with and without textile or entrepreneurial experience. One-way ANOVA with Tukey's HSD tested differences among plant materials. Multiple regression was used to identify predictors of ecopreneurial intention, with significance set at $p < .05$.

Results and Discussion

4.1 Socio-demographic Profile

A total of 150 respondents evaluated the eco-printed textile products and completed the questionnaire. The participants came from different age groups and occupational backgrounds.

The largest group was aged 26–35 years (34.0%), followed by those aged 18–25 years (30.0%). Respondents aged 36–45 years made up 22.0% of the sample, while 14.0% were above 45 years.

In terms of education, 44.0% had postgraduate qualifications, 38.0% were graduates, and 18.0% belonged to other educational categories. Slightly more than half of the respondents, 52.0%, reported previous experience in textiles, handicrafts, fashion, interior products, or related creative work.

Table 1. Socio-demographic characteristics of respondents (n = 150)**

Variable	Category	n	%
Age	18–25 years	45	30.0
	26–35 years	51	34.0
	36–45 years	33	22.0
	>45 years	21	14.0
Educational qualification	Undergraduate	57	38.0
	Postgraduate	66	44.0
	Other	27	18.0
Previous textile/craft experience	Yes	78	52.0
	No	72	48.0
Previous entrepreneurial experience	Yes	39	26.0
	No	111	74.0
Prior awareness of eco-printing	Yes	42	28.0
	No	108	72.0

Although many participants had not heard of eco-printing before the study, more than half had some background in textiles or crafts. This made the sample useful for exploring whether eco-printing could be developed as an enterprise-oriented skill.

4.2 Consumer evaluation of eco-printed textile products

Participants rated the textile samples on a five-point scale, where 1 represented "very poor/strongly disagree" and 5 represented "excellent/strongly agree."

The overall response was positive. Product uniqueness received the highest mean score of 4.31 ± 0.66. Aesthetic appeal followed closely at 4.25 ± 0.63, and design originality recorded 4.22 ± 0.67.

Perceived environmental sustainability received a mean score of 4.18 ± 0.69. This suggests that respondents generally connected eco-printing with environmentally responsible textile production. Purchase intention was somewhat lower but still favourable, with a mean of 3.91 ± 0.81.

Table 2. Consumer evaluation of eco-printed textile products

Attribute	Mean	SD
Product uniqueness	4.31	0.66
Aesthetic appeal	4.25	0.63
Design originality	4.22	0.67
Environmental sustainability	4.18	0.69
Colour attractiveness	4.12	0.72
Perceived product quality	4.08	0.70
Overall acceptability	4.05	0.71
Purchase intention	3.91	0.81

The strong response to uniqueness is important for small producers. Eco-printing creates naturally varied botanical patterns, which can help small enterprises stand out without needing to compete with mass-produced textiles on price or volume.

4.3 Perception of sustainability

Most respondents saw eco-printing as an environmentally responsible process. In total, 84.0% agreed or strongly agreed that it could reduce dependence on conventional synthetic textile coloration. Another 80.7% felt that the use of plant materials was environmentally desirable.About 78.7% believed that eco-printing could be combined with textile waste or fabric remnants to create useful products.

Table 3. Perceptions regarding environmental sustainability

Statement	Agree/Strongly agree n	%
Eco-printing represents an environmentally responsible textile technique	129	86.0
Plant materials can provide an alternative source of textile colour/design	126	84.0
Eco-printing can reduce dependence on conventional synthetic coloration	126	84.0
Textile waste can be converted into useful eco-printed products	118	78.7
Locally available plant materials can support sustainable production	124	82.7
Eco-printed products have environmental value for consumers	121	80.7

These responses suggest that environmental positioning can add to the perceived value of eco-printed products. However, positive perception alone does not prove environmental superiority. Real sustainability depends on water use, energy consumption, auxiliary chemicals, transport, product durability, and what happens to the product at the end of its life.

4.4 Evaluation of plant materials

The five plant materials were compared for colour intensity, motif clarity, aesthetic appeal, and overall acceptability.

Eucalyptus produced the best overall result, with a mean score of 4.28 ± 0.51. Guava followed at 4.16 ± 0.55, while mango recorded 4.03 ± 0.58. Hibiscus and bougainvillea received comparatively lower overall ratings.

Table 4. Evaluation of selected plant materials

Plant material	Colour intensity Mean ± SD	Motif clarity Mean ± SD	Aesthetic appeal Mean ± SD	Overall Mean
Eucalyptus	4.35 ± 0.57	4.27 ± 0.61	4.22 ± 0.58	4.28
Guava	4.18 ± 0.62	4.12 ± 0.65	4.18 ± 0.59	4.16
Mango	4.05 ± 0.66	4.01 ± 0.63	4.03 ± 0.61	4.03
Hibiscus	3.79 ± 0.71	3.83 ± 0.69	3.91 ± 0.67	3.84
Bougainvillea	3.68 ± 0.74	3.75 ± 0.72	3.86 ± 0.69	3.76

One-way ANOVA showed a statistically significant difference among the plant materials in overall aesthetic evaluation, $F(4, 745) = 13.84$, $p < 0.001$, $\eta^2 = 0.069$. Plant-material type accounted for about 6.9% of the variation in overall evaluation.Post-hoc comparisons showed that eucalyptus received significantly higher ratings than hibiscus and bougainvillea. The difference between eucalyptus and guava was smaller.

4.5 Colour fastness

Colour fastness varied across the plant materials. Eucalyptus-based samples showed the highest mean wash-fastness rating at 4.10 ± 0.54, while bougainvillea recorded the lowest at 3.42 ± 0.67.

Table 5. Colour-fastness performance

Plant material	Wash fastness	Dry rubbing	Wet rubbing	Overall
Eucalyptus	4.10	4.18	3.92	4.07
Guava	3.96	4.06	3.79	3.94
Mango	3.82	3.95	3.68	3.82
Hibiscus	3.58	3.76	3.51	3.62
Bougainvillea	3.42	3.64	3.38	3.48

These results show that plant selection matters not only for appearance but also for durability. Fabrics with lower fastness may be better suited to decorative products, wall art, bags, or limited-wash accessories rather than clothing that needs frequent washing.

4.6 Reliability analysis

Cronbach's alpha was calculated to determine the internal consistency of the questionnaire scales.

All constructs demonstrated alpha values above 0.70. The highest reliability was obtained for ecopreneurial intention (α = 0.91), followed by entrepreneurial self-efficacy (α = 0.89).

Table 6. Reliability analysis

Construct	Items	Cronbach's α
Environmental sustainability	5	0.86
Product value	5	0.88
Technical feasibility	5	0.82
Market opportunity	5	0.85
Entrepreneurial self-efficacy	5	0.89
Ecopreneurial intention	5	0.91

Cronbach's alpha was calculated to check the internal consistency of the questionnaire scales. All constructs exceeded 0.70, indicating acceptable reliability.The highest reliability was found for ecopreneurial intention (α = 0.91), followed by entrepreneurial self-efficacy (α = 0.89).

4.7 Descriptive statistics

The mean scores for the main study variables were above the midpoint of 3.00. Entrepreneurial self-efficacy recorded the highest mean at 4.08 ± 0.63, followed by environmental sustainability at 4.06 ± 0.65. Market opportunity had the lowest mean at 3.72 ± 0.77.

Table 7. Descriptive statistics of major variables

Variable	Mean	SD
Environmental sustainability	4.06	0.65
Product value	4.02	0.67
Technical feasibility	3.84	0.71
Market opportunity	3.72	0.77
Entrepreneurial self-efficacy	4.08	0.63
Ecopreneurial intention	3.89	0.74

The lower market-opportunity score suggests that respondents may like the products but remain unsure whether enough customers would be available. This distinction matters because liking a sustainable product does not always mean that a business based on it will be viable.

4.8 Correlation analysis

Pearson's correlation showed significant positive relationships among the main variables. Environmental sustainability was positively associated with product value ($r = 0.56$, $p < 0.001$). Product value was also related to market opportunity ($r = 0.48$, $p < 0.001$).

Technical feasibility showed a moderate positive relationship with entrepreneurial self-efficacy ($r = 0.51$, $p < 0.001$). The strongest association was between entrepreneurial self-efficacy and ecopreneurial intention ($r = 0.68$, $p < 0.001$).

Table 8. Correlation matrix

Variable	1	2	3	4	5	6
1. Environmental sustainability	1.00					
2. Product value	.56***	1.00				
3. Technical feasibility	.43***	.45***	1.00			
4. Market opportunity	.39***	.48***	.44***	1.00		
5. Entrepreneurial self-efficacy	.41***	.46***	.51***	.57***	1.00	
6. Ecopreneurial intention	.44***	.52***	.49***	.61***	.68***	1.00

***$p < 0.001$.

The pattern suggests that ecopreneurial intention is shaped by both personal and market-related factors. Confidence in one's entrepreneurial ability appears especially important, though perceived market opportunity also plays a substantial role.

4.9 Multiple regression analysis

Multiple regression was used to examine whether environmental sustainability, product value, technical feasibility, market opportunity, and entrepreneurial self-efficacy predicted ecopreneurial intention.The model was statistically significant, $F(5, 144) = 38.72$, $p < 0.001$. It explained approximately 57.3% of the variance in ecopreneurial intention ($R^2 = 0.573$; adjusted $R^2 = 0.558$).

Table 9. Multiple regression predicting ecopreneurial intention

Predictor	B	SE	β	t	p
Environmental sustainability	0.12	0.07	0.11	1.71	.089
Product value	0.16	0.07	0.15	2.24	.027
Technical feasibility	0.14	0.06	0.13	2.18	.031
Market opportunity	0.24	0.07	0.25	3.43	.001
Entrepreneurial self-efficacy	0.39	0.08	0.37	4.88	<.001

$R^2 = 0.573$; adjusted $R^2 = 0.558$; $F(5, 144) = 38.72$; $p < 0.001$.

Entrepreneurial self-efficacy was the strongest predictor, with $\beta = 0.37$, $p < 0.001$. Market opportunity followed with $\beta = 0.25$, $p = 0.001$. Product value ($\beta = 0.15$, $p = 0.027$) and technical feasibility ($\beta = 0.13$, $p = 0.031$) also contributed significantly.

Environmental sustainability had a positive but non-significant independent effect once the other predictors were included ($\beta = 0.11$, $p = 0.089$). This is an important finding. Believing that eco-printing is good for the environment may not be enough to make someone want to start a business. They also need to feel that the technique can be managed, that customers exist, and that they personally have the ability to run an enterprise.

4.10 Comparison according to previous textile experience

Respondents with previous textile or craft experience recorded a higher mean ecopreneurial-intention score (4.08 ± 0.63) than those without such experience (3.69 ± 0.81).

An independent-samples t-test showed that this difference was statistically significant, $t(148) = 3.36$, $p = 0.001$, Cohen's $d = 0.55$.

Table 10. Ecopreneurial intention according to textile experience

Experience	n	Mean	SD
Previous textile/craft experience	78	4.08	0.63
No previous experience	72	3.69	0.81

The moderate effect size suggests that familiarity with textile materials and processes may make people feel more confident about adopting eco-printing as a business activity.

4.11 Ecopreneurial intention according to previous entrepreneurial experience

Participants with previous entrepreneurial experience had a mean ecopreneurial-intention score of 4.19 ± 0.58, compared with 3.79 ± 0.77 among those without such experience.

This difference was also statistically significant, $t(148) = 3.14$, $p = 0.002$, Cohen's $d = 0.52$. The result suggests that earlier exposure to business activities may make people less anxious about the challenges of starting a sustainable textile enterprise.

4.12 Economic analysis

The economic analysis was based on one representative eco-printed textile product. The estimated total production cost per product was ₹286, covering materials, labour, energy, water, finishing, and overhead expenses.

With a proposed selling price of ₹450, the contribution per product was ₹164.

Table 11. Production cost and economic feasibility

Cost component	Cost/product (₹)
Fabric/upcycled textile	70
Plant material	15
Mordant/fixative	12

Labour	105
Water	8
Energy	18
Finishing	20
Packaging	18
Overhead	20
Total cost	**286**
Proposed selling price	**450**
Contribution/product	**164**

The contribution margin was approximately 36.4% of the selling price. If fixed monthly costs were assumed to be ₹20,000, the estimated break-even quantity would be:

$$\text{BEQ} = \frac{20{,}000}{164} \approx 122 \text{ units/month}$$

Under these assumptions, around 122 units would need to be sold each month to cover fixed costs. Labour was the largest single expense, making up roughly 36.7% of the total production cost. This highlights the importance of improving labour productivity without losing the handcrafted character of the products.

Hypothesis testing

Table 12. Summary of hypothesis testing

Hypothesis	**Result**
H1: Environmental sustainability is positively associated with product value	**Supported**
H2: Product uniqueness is positively associated with purchase intention	**Supported**
H3: Technical feasibility predicts ecopreneurial intention	**Supported**
H4: Market opportunity predicts ecopreneurial intention	**Supported**
H5: Entrepreneurial self-efficacy predicts ecopreneurial intention	**Supported**
H6: The combined predictors significantly explain ecopreneurial intention	**Supported**
H7: Ecopreneurial intention differs according to textile experience	**Supported**

Discussion

General interpretation

The findings suggest that eco-printing can serve several purposes at once. It can be a sustainable textile technique, a way of creating distinctive products, and a possible opportunity for micro-enterprise development.Respondents generally held favourable views of eco-printed textiles. The mean scores for environmental sustainability, product value, and ecopreneurial intention were all above the midpoint of the scale.The regression results, however, add an important nuance. Although environmental sustainability was related to ecopreneurial intention, it did not remain significant when product value, technical feasibility, market opportunity, and entrepreneurial self-efficacy were considered together. In other words, appreciating the environmental side of eco-printing alone may not be enough to inspire someone to start a business.

Product uniqueness and consumer value

Product uniqueness received the highest consumer rating. This finding is especially relevant for small and micro textile enterprises, which often cannot compete with large manufacturers on standardisation, volume, or cost.Eco-printing offers a different kind of advantage. Because plant shape, pigment transfer, and pattern placement vary naturally, no two products need to look exactly alike. This variation can become a selling point rather than a flaw.Small enterprises could use this quality to position their products as one-of-a-kind pieces, limited collections, botanical designs, personalised gifts, locally inspired ranges, or premium handcrafted textiles. Eco-printing may therefore be better suited to niche sustainable markets than to low-cost mass production.

Environmental sustainability

A large share of respondents viewed eco-printing as environmentally responsible. This is understandable, since the technique is associated with plant materials, natural processes, and the reuse of textile waste.At the same time, the study draws attention to the difference between perceived sustainability and measured sustainability. Eco-printing may require washing, mordanting, steaming, and drying. If these steps use considerable water and energy, some of the environmental benefit may be reduced.Future enterprises should therefore measure their resource use and communicate sustainability claims carefully. Terms such as “natural” or “eco-friendly” should be supported by evidence rather than used as general marketing labels.

Technical feasibility

Technical feasibility was significantly related to ecopreneurial intention. This suggests that people are more likely to consider eco-printing as a business when they believe they can carry out the process successfully.Training programmes should therefore include practical demonstrations and clear working procedures. Learners need guidance on fabric preparation, plant selection, plant-to-fabric ratio, moisture, temperature, processing time, mordant concentration, steaming conditions, and post-treatment.Standardisation does not mean removing the handmade quality of eco-printing. Rather, it means developing enough control over the process to produce dependable results while still allowing natural variation in the final design.

Market opportunity

Market opportunity was another significant predictor of ecopreneurial intention. Respondents did not view sustainability separately from commercial reality. Even when they liked eco-printed products, they recognised that a business would need customers and a suitable price point.Possible markets include sustainable fashion items such as scarves, stoles, tops, skirts, apparel panels, and accessories. Home-interior products such as cushion covers, table runners, wall panels, lampshades, and decorative textiles also offer potential.Other possibilities include lifestyle products such as bags, pouches, notebooks, gifts, and textile accessories. Institutional buyers may provide another route through corporate gifts, sustainable-event products, and customised merchandise.

Entrepreneurial self-efficacy

Entrepreneurial self-efficacy was the strongest predictor of ecopreneurial intention. This indicates that confidence in one's ability to handle business tasks plays a major role in converting interest into action.A person may understand the technical side of eco-printing but still hesitate to start a business because of concerns about pricing, finding customers, managing money, digital marketing, competition, inventory, or risk.For this reason, eco-printing training should not focus only on textile skills. It should also build enterprise abilities. A useful learning sequence could move from technical skill to product development, costing, branding, digital marketing, sales, and business management.

Role of previous textile experience

Respondents with prior textile or craft experience showed higher ecopreneurial intention. Familiarity with fabrics, colours, and manual processes may reduce the technical barriers associated with eco-printing.For participants without such experience, introductory training could cover fibre identification, fabric selection, fabric preparation, basic colour theory, plant identification, eco-printing methods, textile finishing, and quality evaluation. This would make the technique more accessible to students and community members who are new to textiles.

Role of previous entrepreneurial experience

Those with entrepreneurial experience also showed stronger intention to pursue eco-printing-based enterprise. Previous exposure to pricing, customers, marketing, and financial decisions may help people see how a textile technique can become a business model.Entrepreneurship education should therefore not be limited to people who already run businesses. Simulated projects can offer similar learning. For example, students could receive a small production budget and be asked to source materials, develop products, calculate costs, set prices, create a brand, photograph products, market them online, and calculate profit or loss.Such activities can connect classroom learning with the practical realities of ecopreneurship.

Economic feasibility and labour

The economic analysis showed that labour is a major part of production cost. This is expected in handmade textile work, since eco-printing involves fabric preparation, arranging plant material, bundling, steaming, drying, finishing, and quality checking.Because of this, an eco-printing enterprise should avoid competing mainly on low price. Instead, it can increase value through design differentiation, customisation, premium packaging, storytelling, direct-to-consumer sales, limited editions, institutional orders, and higher-value finished products.Using textile waste can also reduce raw-material costs. However, the quality and fibre composition of waste fabric must still be checked carefully.

Eco-printing and circular entrepreneurship

Using textile waste in eco-printing creates a clear circular-economy opportunity. A discarded or visually unattractive fabric can be transformed through botanical printing into a new product with greater perceived value.The circular pathway can be understood as follows:

Textile waste → sorting and preparation → eco-printing → design enhancement → value-added product → consumer use → extended material life**

This approach shifts attention away from disposal and towards creative reuse and value creation.

Implications for women-led micro-enterprises

Eco-printing may be particularly suitable for home-based and community enterprises because production can begin on a small scale. A basic enterprise could start with limited equipment, locally collected plant materials, small quantities of fabric, home-based production, direct sales, and made-to-order products.Over time, such an enterprise could expand into workshops, customised institutional orders, online sales, and collaborations with designers. However, support should include market access, financial literacy, and digital marketing, not technical training alone.

Implications for higher education

The findings are relevant to Home Science, Textile Design, Fashion Design, Interior Design, and Resource Management programmes. Eco-printing can become an interdisciplinary student project that brings together textile science, sustainability, design, entrepreneurship, and digital marketing.Students could develop a small sustainable product brand as part of experiential learning. This would help prepare them not only for employment but also for self-employment and the creation of green enterprises.

Integrated Ecopreneurship Model

Based on the findings, the following model is proposed:

Environmental resources: local plants and textile waste

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Textile innovation: eco-printing

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Product characteristics:~ uniqueness, aesthetics, and sustainability

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Consumer value: perceived quality, environmental value, and willingness to purchase

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Business conditions: market opportunity and acceptable pricing

↓

Entrepreneurial capability: technical feasibility and entrepreneurial self-efficacy

↓

Ecopreneurial intention

↓

Green micro-enterprise

The model shows that successful eco-printing entrepreneurship depends on environmental, technical, market, and personal factors working together.

Overall Interpretation of the Findings

The study produced five main observations.

First, respondents generally viewed eco-printed products positively, especially in terms of uniqueness and aesthetic appeal. Second, plant materials differed noticeably in visual performance, showing that careful selection and process optimisation are necessary.

Third, product value, technical feasibility, market opportunity, and entrepreneurial self-efficacy were all positively related to ecopreneurial intention. Fourth, entrepreneurial self-efficacy was the strongest predictor in the regression model. Fifth, previous textile and entrepreneurial experience were associated with higher intention to pursue eco-printing-based enterprise.

Taken together, these findings suggest that eco-printing should not be promoted only as a sustainable craft. Its enterprise potential becomes stronger when it is connected with product development, quality control, costing, market analysis, and entrepreneurship education.

Conclusion

This study of 150 respondents found generally favourable perceptions of eco-printing as a sustainable textile innovation and a possible green-enterprise opportunity.Respondents valued product uniqueness and aesthetic appeal highly. Differences among plant materials showed that the choice of biological material influences the quality of eco-printed textiles. The behavioural analysis also revealed significant relationships between product value, technical feasibility, market opportunity, entrepreneurial self-efficacy, and ecopreneurial intention.The regression model explained 57.3% of the variance in ecopreneurial intention. Entrepreneurial self-efficacy emerged as the strongest predictor, followed by market opportunity.These results indicate that eco-printing entrepreneurship requires more than environmental awareness. Successful enterprise development also depends on technical competence, product differentiation, confidence in one's entrepreneurial abilities, and access to viable markets.Eco-printing can therefore provide a foundation for small-scale circular textile enterprises based on plant resources, textile upcycling, and design-led value creation. For practical implementation, training programmes should combine eco-printing techniques with costing, product development, branding, digital marketing, and entrepreneurial skills.

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