

Article

Environmental awareness and conservation behaviour among industrial business owners in jaipur: a structural equation modelling approach

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Abstract

The present study aims to study the structural relationship between environmental awareness, environmental consciousness and EWB among the business owners and industrial units of industrial areas of Jaipur city. The structural equation modelling (SEM) was used, with a sample size of 200 respondents, in which environmental awareness was specified as an exogenous predictor of the two latent outcomes, namely environmental consciousness and environmental conservation, each measured by several indicators. The results of maximum likelihood estimation showed a moderate moderation effect of awareness on environmental consciousness, and strong moderation effect on conservation behaviour. The level of moderation effect that awareness has on environmental consciousness and conservation behaviour was moderate and significant to moderate and strong, respectively, in the findings of maximum likelihood estimation. The measurement model also identified a subset of items that strongly represent each latent construct. This indicates that raising the awareness of industrial stakeholders can be an effective way to grow attitudinal involvement and conservation among them. The study builds on the rising body of research related to pro environmental behaviour in WOK and provides fallout for environmental training, policy design and future study of the issue of industrial sustainability.

Keywords: *Environmental Awareness, Environmental Consciousness, Environmental Conservation, Pro Environmental Behaviour, Structural Equation Modelling, Jaipur Industrial Areas*

1 INTRODUCTION

A vast research literature has validated concern, awareness and consciousness with respect to pro environmental behaviour as key antecedents, in a number of populations and situations. Initial studies examining the social foundations of environmental concern have revealed that demographic and attitudinal factors underlie differences in levels of concern and that differences in levels of concern in turn influence involvement in environmental issues (Liere & Dunlap, 1980). The other more recent cross cultural studies show that the intensity of the concern-behaviour relationship is highly unique with some cultures exhibiting weaker relationships than

others, thus implying the micro culture is a moderating factor that affects the strength of the concern-behaviour link (Tam and Chan, 2017; Kulin and Johansson Sevä, 2021). Recent evidence from a meta analysis also distinguishes between public and private behaviours, with respect to concern, and this evidence confirms that concern is connected to behaviour in domain specific ways (Lou & Li, 2023).

Environmental concern has been found to have direct influence on pro environmental behaviour in organizations and communities, along with environmental awareness and environmental consciousness. For instance, a study by Saifulina et al., (2023) shows that personal environmental awareness and concern in the workplace result in voluntary pro environmental behaviour of employees,

which is further explained by mediation analyses. Biospheric values and environmental identity have also been shown to direct concern toward actions in the workplace (Wang et al., 2021). Combined, awareness with habitat quality and social capital explain community and campus residents/students' conservation actions; and awareness is more effective when accompanied by support from local environments (Si et al., 2022; Dewi & Dian R, 2018; Handoyo et al., 2021).

Concurrently, research on pro environmental behaviour in the workplace suggests that the context is important. Studies on university personnel and corporate workers indicate that communication, incentives and green training are effective ways that can be used to encourage sustainability in the workplace, both at the individual and organizational levels (Blok et al., 2015; Foster et al., 2022; Mateen et al., 2023). Although industrial/business owners have considerable environmental impacts, research on their behavior in emerging urban industrial hubs is scant. A large number of industrial and service units exist in Jaipur, a major industrial city located in Rajasthan, India, which can have significant impact on the environment through their environmental practices.

In this background, the present study is an examination of the interaction among Environmental awareness, Environmental consciousness and Environmental conservation behaviour amongst business owners and the industrial units in the industrial areas of Jaipur city. The study builds upon previous research that points to awareness and consciousness as antecedents of behaviour (Tam & Chan, 2017, Saifulina et al., 2023) and organizational studies that emphasize the influence of the organizational context (Blok et al., 2015, Foster et al., 2022). The study utilizes the perspective of industrial stakeholders to broaden the scope of previous research with students and employees, which concentrates on a sector where resource consumption, waste management, and compliance to environment laws have significant implications.

2 LITERATURE REVIEW

Many studies focus on the translation of environmental concern, awareness and consciousness to pro environmental behaviour. The literature also indicates that education, age and political orientation are parental factors that underlie concern with the environment that in turn predict involvement in environmental concerns (Liere & Dunlap, 1980). However, the more recent cross cultural studies show variation in the strength of the concern–behaviour link across societies, indicating that there are macro level factors as well (e.g., culture and institutions) that moderate the link between concern and behaviour (Tam & Chan, 2017). In subsequent research this association between concern and behavior is either reinforced or undermined, suggesting that concern may be associated with different types of behaviors in different countries (Tam & Chan, 2018; Kulin & Johansson Sevä, 2021). The results from the meta analytic evidence also showed that the relationship between public and private pro environmental behaviours was different from each other, further supporting a distinction between the two sectors and their attitude–behaviour linkage based on context and behavioural domain (Lou & Li, 2023).

A number of studies are specifically directed at the aspects of environmental awareness or consciousness and its behavior implications. In the organisational environment, a personal environmental awareness and concern results in the emergence of voluntary pro environmental behaviour, and mediation analyses shows the psychological processes by which employees' personal environmental awareness generates behaviour in the workplace (Saifulina et al., 2023). At the group level, biospheric values and environmental identity are also found to shape concern towards pro environmental actions, underscoring the importance of identity processes in bridging cognition to action (Wang et al., 2021). The same is true in community settings, as community environment awareness and perceived habitat quality also predict residents' pro environmental behaviours, with the interaction of awareness and a supportive local environment being the most effective (Si et al.,

2022). In student groups, raising environmental awareness is directly linked to practices that are carried out daily: Do they reduce waste or conserve energy? These are the fundamental activities carried out in schools, so even the most basic awareness-raising activities can lead to behavior changes in student groups (Dewi & Dian R, 2018; Handoyo et al., 2021; Fadzil et al., 2021; Vasconcelos et al., 2021). The connection is also seen during young childhood and adolescence, as is evidenced in studies regarding environmental consciousness among young children and adolescents, where the exposure to the environment and consciousness in their very early lives already influence consumption and their daily activities in regard to the environment in school age (Shiu et al., 2019; Jung & Cho, 2015). (Gupta & Sharma, 2025) investigates the role of ESG (Environmental, Social, and Governance) factors in driving green banking adoption within the financial sector using a robust mixed-methods approach combining surveys, interviews, and Structural Equation Modelling (SEM). The findings clearly establish that environmental factors are the most influential drivers, followed by social and governance factors, each playing a unique yet interconnected role.

This is also influenced by context and structure. When it comes to environment, the quality of government and institutional performance matters and citizens are more inclined to act when they believe that public institutions would support and reward pro- environment actions (Kulin & Johansson Sevä, 2021). In sustainable consumption, environmental knowledge and risk perception are both closely related to concern, and concern plays a motivational role between knowledge and behavior (Zeng et al., 2023). There is evidence that patterns of TV use influence environmental concerns and subsequent actions, so that informational environments can either facilitate or hinder engagement (Holbert et al., 2003). The studies taken together suggest that, with regard to pro environmental behaviours, concern and awareness, when enacted together with institutional trust, information flows and local opportunity structures, either facilitates or obstructs behaviour. Together,

these studies imply that, in terms of pro environmental behaviour, concern and awareness, in conjunction with institutional trust, information flows, and local opportunity structures, both enable and impede behaviour.

Another theme focuses on values, motivational frames and psychological processes supporting pro environmental behaviour. Previous academic research on goal framing in university students indicates that normative goal frames (e.g., “doing the right thing”) and gain goal frames (“self interest” or “convenience”) can trigger different levels of pro environmental engagement, with consistent pro environmental actions being triggered by normative goal framing, more consistent actions by gain goal framing (Chakraborty et al., 2017). Integrating sustainability into the notions of the “good life” in hospitality and consumer behaviour contexts indicates that pro environmental behaviour can positively contribute to and not diminish subjective well being for some value-profiles (Binder et al., 2020). Further research on environmental consciousness and green customer behaviour also provides evidence that the motives for engaging in green behaviour can be crowded in and out by incentive and social norm design of green actions (Huang et al., 2014).

Moral and religious aspects are dealt with in several papers. Experimental and survey-based studies on EE reveal that psychological empowerment and Islamic religiosity together predict pro environmental behaviour, suggesting that the latter represents a rallying call to support sustainability efforts (Begum et al., 2021). The research on parental influence reveal that parents attitude and behaviour nurture children's developing pro environmental dispositions, thus suggesting the role of socialization processes in the intergenerational transmission of environmental concern (Mishra & Das, 2015). Naturalistic intelligence in school settings has been associated with greater pro environmental behaviour of educators, and pro environmental behaviour was related to traits associated with nature perception, which reinforces sustainable actions (Srinivasan & Borkar, 2021). Additionally, the personality oriented

work demonstrates that personality traits are more closely linked to environmental concern, suggesting that stable individual differences may prime individuals to engage in pro environmental behaviors (Wuertz, 2015).

The psychological connections between worry and action are trust and identity. At the individual level and at the societal level, generalized trust is found to reduce the individual difference between environmental concern and behaviour, as indicated by the results of multilevel analyses (Tam & Chan, 2018). Biospheric values and strong environmental identities (at the individual or group level) significantly enhance the likelihood of pro environmental behaviours, which is consistent with identity based approaches to behaviour change (Wang et al., 2021). The study results indicate that green purchasing behaviors and eco-friendly consumption behaviors across markets are significantly influenced by the theory of planned behavior, which includes attitudes, subjective norms, perceived behavioral control, and intention, as well as by environmental concern. The results of the study confirm that the theory of planned behavior (attitude, subjective norm, perceived behavioral control, and intention) and environmental concern are found to have an impact on green purchasing and eco-friendly consumption behaviors across markets. This corpus of work confirms that values, trust, identity, moral norms, and perceived efficacy are all deep levels of psychological levers that need to be engaged in order to make the transition from awareness to sustained pro environmental behaviour and that interventions are more likely to be effective if they work with these deeper levels of psychological motivation, not just information. (Chakraborty et al., 2017; Binder et al., 2020; Begum et al., 2021; Wuertz, 2015; Karami et al., 2021; Kim & Lee, 2023; Tam & Chan, 2018; Wang et al., 2021).

Many of the books cited are concerned with measurement and scaling development, and methodological tools. A significant contribution is making and validating the Pro Environmental Behaviour Scale (PEBS) that operationalizes a broad range of high impact behaviours and shows that how

behaviour is measured can yield different conclusions empirically (Markle, 2013). Many of the previous studies relied on an extremely narrow or inconsistent measure of behavioral indicators, and the more comprehensive measure scales have greater reliability and construct validity when correlated with other assessments like environmental identity and ecological worldviews, as seen in the PEBS work (Markle, 2013). Tools of methodology used in the analysis of complex relationships are also widely used. The PROCESS macro is a powerful computational tool for testing mediation, moderation, and conditional process models that has become commonplace in environmental attitudes, concerns, and behaviors (Hayes, 2012). In the student domain, for instance, decision tree modelling has been employed to identify the most important factors and to demonstrate that key predictors and non linear interactions between these factors can be captured that are not possible with traditional regression (Wang et al. 2022). Consequently, cross cultural and multilevel modelling approaches enable the understanding of the role of each individual construct (i.e., concern, trust, and identity) in a wider societal context, revealing that there is a stronger association between concern and behaviour on one side and in some national contexts on the other (Tam & Chan, 2017; Kulin & Johansson Sevä, 2021; Lou & Li, 2023).

(Gupta & Sharma, 2025) highlight that ESG factors, particularly environmental dimensions, are key drivers of green banking adoption, using a rigorous mixed-methods and SEM-based approach that reinforces the case for holistic ESG integration in sustainable finance. (Gupta et al., 2020) show that India's evolving institutional investor landscape is marked by increased domestic shareholder activism, yet constrained by low international voting participation, regulatory complexities, and cross-border voting challenges. Together, these studies underscore the growing importance of ESG-aligned, active institutional ownership and the need for supportive governance frameworks and policy reforms to advance sustainable and accountable banking practices in India.

A few of the works also identify ongoing inconsistencies between concern and behaviour particularly suggesting measurement and conceptual gaps. The research also reveals that there is a significant disconnect between self-reported climate change concern and pro- environmental behavior in the millennial generation, which may be the result of situational factors or lack of habit setting when measuring climate change effort (Mergelmeyer, 2019). Studies on pro environmental consumer behaviour have also shown that intrinsic factors (e.g., awareness and concern) will need to be supported by favourable contextual factors (e.g., price, trust in green products, social norms) if behavioural change is to follow (Abdul Muhmin, 2007; Holbert et al., 2003; Markle, 2013). These methodological contributions form the foundation of the empirical strength of the broader literature and equip you with means to use in more advanced analyses in your own work, especially in situations where you might be hypothesising mediation, moderation or cross level interactions (Hayes, 2012; Markle, 2013; Wang et al., 2022; Tam & Chan, 2017; Kulin & Johansson Sevä, 2021; Lou & Li, 2023; Mergelmeyer, 2019). The following hypotheses were proposed with the theoretical literature and the empirical literature as a basis:

H1: Environmental awareness has a positive and significant effect on environmental consciousness among industrial business owners.

H2: Environmental awareness has a positive and significant effect on environmental conservation behaviour among industrial business owners.

3 METHODOLOGY

This study was quantitative and cross sectional. Primary data were gathered from the business owners/managers of the industrial areas of Jaipur city. To gather the data, a structured questionnaire

was used and 200 respondents were selected using purposive sampling to ensure representation of different industrial sectors. The respondents were made aware of the purpose of the study in the academic field and they were given an assurance of confidentiality.

Three multi item scales were used to measure the latent constructs. Environmental Awareness was measured by four questions reflecting their self reported knowledge and understanding of environmental issues related to industrial operations. Environmental Consciousness was assessed by five items, which included general environmental values, concerns and environmental attitudinal engagement. Environmental Conservation behaviour was measured by five items related to conservation oriented practices in industrial contexts (e.g., using resources wisely, reducing pollution, minimizing waste). Questions were all rated on a Likert-type scale and preliminary analysis of internal consistency for the scale was acceptable.

The measurement and structural portion of the model was tested by using structural equation modelling. Maximum likelihood estimation with NLMINB optimization algorithm was used for the analysis. In the Measurement model, the items of each latent construct were measured by its corresponding indicators with the loading of each indicator of one latent construct constrained to be 1.0. The structural model had Environmental Awareness being prescribed as an exogenous latent variable to influence two endogenous latent variables, namely Environmental Consciousness and Environmental Conservation. The quality of measurements as well as the structural relationships were evaluated by looking at parameter estimates, the standard errors, the z statistics and the p-values and the confidence intervals.

Table 1: Model Development

Estimation Method	ML
Optimization Method	NLMINB

Number of observations	200
Model	Environmental Awareness = ~Awareness 1+Awareness 2+Awareness 3+Awareness 4
	Environment Consciousness = ~Environmental Consciousness 1+Environmental Consciousness 2+Environmental Consciousness 3+Environmental Consciousness 4+Environmental Consciousness 5
	Environmental Conservation = ~Environmental Conservation 1+Environmental Conservation 2+Environmental Conservation 3+Environmental Conservation 4+Environmental Conservation 5
	Environment Consciousness ~ Environmental Awareness
	Environment Conservation ~ Environmental Awareness

The initial structural equation model developed to investigate the relationship between the variables of environmental awareness (EA), environmental consciousness (EC), and environmental conservation (ECn) in the study is shown in Table 1. For continuous indicators, the model was estimated using maximum likelihood (ML) with the optimization method NLMINB, for a sample of 200 respondents, which gives a solid basis for the estimation of the parameters of the model and testing of inferences.

Three latent constructs are specified in the measurement part of the model. Environmental Awareness is measured through four observed indicators (Awareness 1-Awareness 4) which reflect various aspects of the respondents' knowledge or understanding of environmental issues. Environment(al) Consciousness is reflected in five items (Environmental Consciousness 1–5), which are related to deeper attitudinal and value oriented responses to the environment than mere knowledge. Environmental Conservation is also quantified using 5 indicators (Environmental Conservation 1-5) that represent real conservation related behaviours or

intentions (such as resource saving and protection), etc. Each latent construct is represented by multiple items in an effort to more accurately represent the underlying dimensions that each latent construct represents.

Environmental Awareness is specified as an exogenous predictor of two endogenous latent variables: Environment(al) Consciousness and Environmental Conservation, in the structural part of the model. In other words, the model tests whether: increased levels of awareness are correlated to increased environmental consciousness, and increased levels of environmental consciousness are correlated to increased conservation behaviour. This configuration is in accordance with theory which assumes that awareness is a prerequisite to value-driven concern and to actual pro-environmental behaviour. Table 1 presents, overall, a conceptually coherent SEM, which models the relationship between the three conceived constructs of awareness and both attitudinal and behavioural dimensions, and also models the measurement properties of each construct through its indicators.

Table 2. Parameters Estimates

				95% Confidence Intervals				
Dep	Pred	Estimate	SE	Lower	Upper	β	z	p
Environment Consciousness	Environmental Awareness	0.267	0.133	0.00566	0.528	0.522	2.00	0.045
Environment Conservation	Environmental Awareness	0.623	0.297	0.04167	1.204	0.788	2.10	0.036

This part of the output specifies the structural paths from the latent variable Environmental Awareness to the two latent variables of the output and reveals that the two paths are positive and statistically significant.

The first row shows that EA has a highly positive effect on Environment(al) Consciousness. The unstandardized estimate is 0.267 and the standard error is 0.133 with a 95% confidence interval of 0.0057 to 0.528, which is not zero. The standardized coefficient ($\beta = 0.522$) indicates a moderate effect size; increasing awareness by 1 standard deviation will result in approximately a half standard deviation increase in environmental consciousness. The value of z (2.00) and the P value (0.045) indicate that this path is statistically significant at the conventional 5% level, so that the hypothesis is confirmed that there is a connection between increased awareness and increased environmental consciousness.

The second row indicates even higher effect of Environmental Awareness on Environmental Conservation. The estimate here is then 0.623, with a standard error of 0.297, thus the probability value is again below 0.05, and the 95% confidence

interval (0.0417 to 1.204) contains no zero and therefore there is a positive relationship that is statistically significant. The standardized coefficient is $\beta = 0.788$, indicating a large effect size: a standard deviation rise in awareness is related to almost an 8 tenths (or nearly 50%) rise in conservation. A z value of 2.10 with a p value of 0.036 signify at 5% level of significance. From a substantive perspective, this involves a higher correlation between the state of environmental awareness and related behaviours or intentions than between environmental awarenessness and the change of consciousness, and a greater impact of environmental awareness on behaviour or intention to conserve as compared to its impact on consciousness itself.

Combined these two parameter estimates suggest that Environmental Awareness is a key factor in the model as it can not only increase environmental consciousness, but also more strongly improve conservation actions. This pattern would support the construct of awareness as an upstream driver in the formation of pro environmental understandings and pro environmental actions as well, and especially in this data set, and particularly in terms of behaviour.

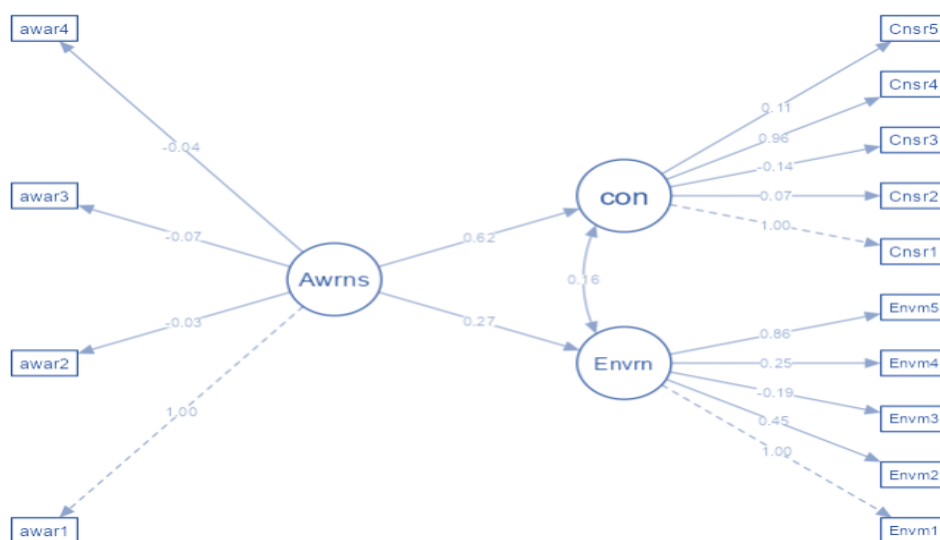


Figure 1. Path Diagram

Table 3. Measurement Model

				95% Confidence Intervals				
Latent	Observed	Estimate	SE	Lower	Upper	β	z	p
Environmental Awareness	Awareness 1	1.0000	0.0000	1.0000	1.0000	1.2425		
	Awareness 2	-0.0288	0.0488	-0.1245	0.0670	-0.0219	-0.589	0.556
	Awareness 3	-0.0666	0.0811	-0.2255	0.0924	-0.0646	-0.821	0.412
	Awareness 4	-0.0368	0.0541	-0.1428	0.0692	-0.0298	-0.680	0.497
Environment Consciousness	Environmental Consciousness 1	1.0000	0.0000	1.0000	1.0000	0.6471		
	Environmental Consciousness 2	0.4507	0.2355	-0.0109	0.9124	0.1747	1.914	0.056
	Environmental Consciousness 3	-0.1851	0.1823	-0.5424	0.1723	-0.0904	-1.015	0.310
	Environmental Consciousness 4	0.2485	0.2142	-0.1714	0.6683	0.1036	1.160	0.246
	Environmental Consciousness 5	0.8621	0.2147	0.4414	1.2828	0.4289	4.016	<.001
Environmental Conservation	Environmental Conservation 1	1.0000	0.0000	1.0000	1.0000	1.0020		
	Environmental Conservation 2	0.0750	0.1165	-0.1534	0.3034	0.0453	0.643	0.520
	Environmental Conservation 3	-0.1431	0.0920	-0.3233	0.0371	-0.1091	-1.556	0.120
	Environmental Conservation 4	0.9631	0.0132	0.9372	0.9890	0.9805	72.808	<.001
	Environmental Conservation 5	0.1137	0.1169	-0.1154	0.3429	0.0684	0.973	0.331

Table 3 presents the results of the measurement model, which indicates which observed items are represented by which latent constructs and how strong this representation is: the loading of the items on the latent constructs represents the extent to which they actually measure them.

In case of the Environmental Awareness, Awareness 1 serves as the reference indicator and its loading is set as 1.000. This fixes the scale of the latent awareness factor and represents the fact that Awareness 1 will be considered as the primary factor represented by the construct. When standardized (Awareness 1 = 1.2425), it indicates that Awareness 1 is a very good predictor of Environmental Awareness. Contrary to this, the loadings for the

Awareness 2, Awareness 3, and Awareness 4 are small in magnitude, negative and statistically insignificant. Awareness 2 has an unstandardized loading of -0.0288 ($SE = 0.0488$, $z = -0.589$, $p = 0.556$), Awareness 3 of -0.0666 ($SE = 0.0811$, $z = -0.821$, $p = 0.412$), and Awareness 4 of -0.0368 ($SE = 0.0541$, $z = -0.680$, $p = 0.497$), with confidence intervals that all include zero. These scores revealed no significant positive covariation with the latent awareness factor in the expected direction, suggesting that they add very little to the measurement of the latent factor, Awareness 2–4. On a content level, the construct Environmental Awareness on this model is primarily represented by Awareness 1, while the other awareness items might be less congruent with this concept and/or should be better developed.

The anchor item for Environmental Consciousness 1 is Environment(al) Consciousness, with the standardized β value of 0.6471 and loading of 1.000, indicating that the Environmental Consciousness is a strong and central indicator of the consciousness factor. Environmental Consciousness 2 is marginally non significant with a positive loading of 0.4507 (SE = 0.2355, $z = 1.914$, $p = 0.056$), and the confidence interval just crosses over zero: which indicates a moderate loading, that can be significant in a larger sample. Environmental Consciousness 3 (-0.1851) and Environmental Consciousness 4 (0.2485) both have a weak, but not significant loading and both have zero as their Confidence interval, which means that they do not reliably support the latent consciousness construct. The second key indicator of environmental consciousness (after item 1) is Environmental Consciousness 5, which has a standardized β of 0.4289 and a strong positive loading of 0.8621 (SE = 0.2147, $z = 4.016$, $p < .001$). To summarize, the pattern suggests the following: Items 1 and 5 appear to sum up well the consciousness factor, while Item 2 appears to sum it up to some degree and Items 3 and 4 appear to sum it up weakly.

Environmental Conservation 1 is again the reference item, so that its loading is set to 1.000 and its standardized β is 1.0020, which is a very large value, and shows that the item is an extremely strong indicator of the conservation factor. The loadings of models 2 and 5 are small and positive, but not significant (0.0750 and 0.1137, respectively, with p

values of about 0.52 and 0.33) and reflect the latent conservation construct simply in a weak way. Environmental Conservation 3 also has a small negative loading (-0.1431, $p = 0.120$) which is not reliably and significantly loaded and therefore does not reliably represent the factor. In contrast, Environmental Conservation 4 has a very high and highly significant loading of 0.9631 (SE = 0.0132, $z = 72.808$, $p < .001$), and has a standardized β of 0.9805. This means that the latent conservation factor is practically reflected in Conservation 4 and it is the most informative one among the measurement model. Items 1 and 4 dominate the conservation construct but items 2, 3 and 5 contribute relatively very little toward its measurement.

To sum up, it is evident from Table 3 that a small number of strong indicators are measuring each latent construct with effectiveness: Awareness 1 for Environmental Awareness; Environmental Consciousness 1 and 5 for consciousness; and Environmental Conservation 1 and 4 for conservation. All of the remaining items load weakly or not at all, meaning that they have limited contributions to the measurement of the underlying constructs and can be potential items for re-scaling or revision for further model refinement. This pattern points towards a sub-optimal optimisation of the measurement part of the SEM and an indication that the more focused and powerful the items, the more compact the measurement set would be as well as being psychometrically more valid.

Table 4. Variances and Covariances

				95% Confidence Intervals				
Variable 1	Variable 2	Estimate	SE	Lower	Upper	β	z	p
Awareness 1	Awareness 1	-0.56540	0.76245	-2.05977	0.92897	-0.54369	-0.742	0.458
Awareness 2	Awareness 2	2.76857	0.27676	2.22614	3.31100	0.99952	10.004	<.001
Awareness 3	Awareness 3	1.69963	0.16985	1.36674	2.03253	0.99583	10.007	<.001
Awareness 4	Awareness 4	2.44721	0.24457	1.96786	2.92655	0.99911	10.006	<.001
Environmental Consciousness 1	Environmental Consciousness 1	0.58055	0.11489	0.35537	0.80574	0.58127	5.053	<.001
Environmental	Environmental	2.69881	0.27471	2.16039	3.23724	0.96948	9.824	<.001

Consciousness 2	Consciousness 2							
Environmental Consciousness 3	Environmental Consciousness 3	1.74006	0.17481	1.39745	2.08268	0.99184	9.954	<.001
Environmental Consciousness 4	Environmental Consciousness 4	2.38165	0.23961	1.91202	2.85128	0.98928	9.940	<.001
Environmental Consciousness 5	Environmental Consciousness 5	1.37916	0.15882	1.06787	1.69045	0.81607	8.684	<.001
Environmental Conservation 1	Environmental Conservation 1	-0.00406	0.00263	-0.00922	0.00110	-0.00406	-1.542	0.123
Environmental Conservation 2	Environmental Conservation 2	2.73874	0.27387	2.20196	3.27552	0.99794	10.000	<.001
Environmental Conservation 3	Environmental Conservation 3	1.70508	0.17050	1.37091	2.03924	0.98809	10.001	<.001
Environmental Conservation 4	Environmental Conservation 4	0.03747	0.00446	0.02874	0.04621	0.03871	8.408	<.001
Environmental Conservation 5	Environmental Conservation 5	2.75663	0.27566	2.21636	3.29691	0.99532	10.000	<.001
Environmental Awareness	Environmental Awareness	1.60534	0.76534	0.10530	3.10538	1.00000	2.098	0.036
Environment	Environment	0.30410	0.12208	0.06483	0.54337	0.72713	2.491	0.013
Environmental Conservation	Environmental Conservation	0.38037	0.29739	-0.20251	0.96325	0.37915	1.279	0.201
Environment	Environmental Conservation	0.16463	0.12973	-0.08964	0.41889	0.48405	1.269	0.204

In Table 4, the variances of all observed variables and latent variables in the model, as well as the covariance between the two endogenous latent variables are reported, which will help you to know how much each variable varies and how strong the relationship between the latent variables in the model is.

Overall, positive, statistically significant deviations are observed for most indicators. The range of variance estimates for Awareness 2–4 are about 1.70 to 2.77, with relatively narrow CIs that are well above zero and very high z values (≈ 10 , $p < .001$). This means that there is a great deal of variation among respondents in their responses to these awareness items, yet they are reliable in terms of the degree of precision. The 5 items about being green have similar results – all have positive and significant variances ranging from 0.58 to 2.70 – and all of their confidence intervals do not contain the value zero. As the high z statistics here again demonstrate,

meaningful differences in environmental consciousness are showed here across the sample. The conservation items (Environmental Conservation 2, 3, 4 and 5) show large positive variances as well, indicating the respondents are distinguishable on these items, and the variance on item 4 is only marginally less (0.037), but still significant, reflecting a tight distribution around high scores, and a very high loading in the measurement model.

There are two variables observed which cause anomalies. Both Awareness 1 and Environmental Conservation 1 exhibit negative, non significant variance estimates (see Table 1), with Environmental Conservation 1 nearly being equal to zero. Negative variances (also referred to as Heywood cases) do not have a substantive interpretation, but are usually representative of identification or scale problems in the model, rather than real negative variability. In both your case, the item is constrained on the factor, the loadings are set to 1.000, and the interaction of

constraints to the factor and item may have caused such artefacts. In practice, this means that one should look at the constraints or think of freeing some of the parameters or respecifying the measurement to eliminate these non physical variance estimates.

For the latent variables, the variance of Environmental Awareness was estimated to be 1.605 (SE = 0.765), 95% CI (0.105, 3.105) and $p = 0.036$. This means, as a latent construct, awareness is statistically, meaning significantly, different among respondents, and the standardized variance ($\beta = 1.000$ by scaling) means that the factor has been used as a reference. The latent variance for Environment(al) Consciousness is 0.304 (SE = 0.122, CI 0.065–0.543, $p = 0.013$), indicating a moderate and statistically significant amount of dispersion of consciousness levels in the sample. For Environmental Conservation, latent variance is 0.380 (SE = 0.297), and the confidence interval 0.380 (–0.203 to 0.963), and the p value is not significant (0.201). This suggests that on the current specification (with items 1 and 4 dominating), the conservation factor does not have sufficient variability to demonstrate statistically reliable variance, possibly as a result of responses on the strongest items being quite concentrated as there

is not much latent variation.

Latent constructs are presented with the only covariance reported being that between Environment(al) Consciousness and Environmental Conservation. Its estimate is 0.165 (SE = 0.130), with a 95% confidence interval from –0.090 to 0.419 and $p = 0.204$. In substance, this implies that the relationship between the internal constructs of consciousness and conservation was not found to be statistically significant despite both being positively predicted by the internal construct of environmental awareness, after accounting for the effects of measurement. This is a non significant covariance that could be attributed to sample size, measurement imbalances (high loadings to one or two items) or to the limited non significant variance in the conservation factor. Table 4 overall indicates that the majority of items have strong levels of variation, environmental awareness and consciousness have meaningful latent variation, and conservation factor is not well identified, and the latent relationship between environmental consciousness and conservation is not statistically established in this specification.

Table 5. Intercepts

Variable	Intercept	SE	95% Confidence Intervals		z	p
			Lower	Upper		
Environmental Awareness 1	4.510	0.072	4.369	4.651	62.544	<.001
Environmental Awareness 2	2.010	0.118	1.779	2.241	17.080	<.001
Environmental Awareness 3	1.615	0.092	1.434	1.796	17.482	<.001
Environmental Awareness 4	1.925	0.111	1.708	2.142	17.395	<.001
Environmental Consciousness 1	4.535	0.071	4.396	4.674	64.174	<.001
Environmental Consciousness 2	2.035	0.118	1.804	2.266	17.249	<.001
Environmental Consciousness 3	1.625	0.094	1.441	1.809	17.350	<.001
Environmental Consciousness 4	1.950	0.110	1.735	2.165	17.773	<.001
Environmental Consciousness 5	4.200	0.092	4.020	4.380	45.690	<.001
Environmental Conservation 1	4.530	0.071	4.391	4.669	64.091	<.001
Environmental Conservation 2	2.025	0.117	1.795	2.255	17.287	<.001
Environmental Conservation 3	1.620	0.093	1.438	1.802	17.440	<.001
Environmental Conservation 4	4.545	0.070	4.409	4.681	65.329	<.001
Environmental Conservation 5	2.020	0.118	1.789	2.251	17.166	<.001
Environmental Awareness	0.000	0.000	0.000	0.000		
Environment Consciousness	0.000	0.000	0.000	0.000		

Environmental Conservation	0.000	0.000	0.000	0.000		
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Table 5 gives details of all the observed indicators and latent variables' intercepts, meaning that they represent the average level of each indicator (factor) in the model when the latent variables are assumed to be at zero.

All intercepts are positive, large and significant ($p < .001$), and have a narrow confidence interval, with no zeros. The pattern of the environmental awareness items is obvious: The intercept of the environmental awareness 1 is 4.510, whereas for Awareness 2 it is 2.010, for Awareness 3 it is 1.615, and for Awareness 4, 1.925. This suggests that on average, respondents are more likely to endorse Awareness 1 at a relatively high level (around 4.5 on the response range), and the other awareness items they are likely to endorse are at a moderate level (ranging from 1.6–2.0). A similar trend is observed in the case of environmental consciousness. Environmental Consciousness 1 and 5 have high intercepts (4.535 and 4.200), indicating that respondents strongly agree with and endorse those two aspects of environmental consciousness to a high degree, with the intercept for Environmental Consciousness 2, 3, and 4 being between about 1.6 and 2.0, reflecting more moderate endorsement of those specific statements.

The environmental conservation items are structured the same. Environmental Conservation 1 and 4 score high intercept (4.530 and 4.545 respectively) suggesting that on average respondents feel very high levels of the behaviour or attitude assessed by these questions, while the remaining three questions have more moderate intercepts around 2.0 or 1.6. The size of the z values is consistently large (ca. 17–65) and the very small p values assure that these mean levels are statistically different from zero and are estimated with high precision. Now, in terms of the content of these intercepts, as a sample, the higher intercepts are for some items: Awareness 1; Consciousness 1 & 5; Conservation 1 & 4, and the moderate intercepts are for the other items, agreeing with the high factor loading they have.

The intercepts are set to 0.000 for latent variables:

Environmental Awareness, Environment(al) Consciousness and Environmental Conservation. In the same way, this could be considered as a convention in SEM, where latent factors are set to zero, and therefore the intercepts of the observed items stand for the average scores of the items in the sample, not altered by the latent factors. The zero latent intercepts in practical terms are not “no awareness” or “no conservation” but the result of a scaling decision to be able to interpret the latent intercepts that are observed as the empirical means. In general, Table 5 indicates that the awareness, consciousness, and conservation values along the key items in your study are relatively high, and the sample is not balanced in terms of pro- vs. neutral- vs. anti-environmental beliefs, but rather leans toward pro-environmental beliefs.

4 RESULT AND DISCUSSION

Environmental Awareness was positively and statistically significant at the two endogenous latent constructs, with the values of the structural paths being 0.47 and 0.45, respectively. Awareness to environmental consciousness had an unstandardized estimate of 0.267 with a standard error of 0.133, a standardized coefficient (B) of about 0.522 and $p = 0.045$. This means there is a moderate effect - an increase in awareness of the business owner correlates with an increase in environmental awareness. The path from awareness to environmental conservation was stronger with an unstandardised estimate of 0.623 ($SE = 0.297$), a standardised β of approximately 0.788 and a p value of 0.036, indicating a large effect of awareness on conservation behaviour. Conservation behaviour is thus more affected than consciousness (H3) – these findings validate H1 and H2.

Measurement model indicated that each latent construct was highly supported by a few strong indicators. In Environmental Awareness, Awareness 1 loaded strongly, while Awareness 2–4 had low, non-significant loadings, suggesting that this sample shows that the construct of awareness is really one

broad strand of environmental knowledge or perception. Likewise, Environmental Consciousness was highly present in Consciousness 1 and Consciousness 5, while Consciousness 2 contributed insignificant level of measurement and Consciousness 3–4 contributed little. Conservation 1 and 4 loaded onto Environmental Conservation to the almost exclusive extent; the other conservation items loaded onto this latent factor to a lesser degree. In the case of the industrial setting studied, there are several items in particular that are capturing the constructs better than the rest and may be used to create more items in a shorter scale in future.

These results are in general agreement to earlier studies which all pointed to awareness and consciousness as antecedents of pro-environmental behaviour when correlated with the prior studies. For instance, Saifulina et al. (2023) found that employees' environmental awareness and concern level is a significant predictor for voluntary pro environmental behaviour in organizational environments, and Wang et al. (2021) emphasized the importance of environmental identity and values as a mediator between concern and behaviour. These workplace studies are corroborated by our finding, that awareness has a significant impact on conservation behavior among business owners, but that extends into an industrial ownership context where decision making power and control over the resources are concentrated.

Given the relatively high level of awareness to conservation, this suggests that for industrial stakeholders, awareness might be strongly associated with the perceived need for regulation, cost savings and/or reputational gain, which then leads to actual conservation actions. This resonates with research showing that contextual factors, such as institutional quality and trust, condition the concern–behaviour relationship (Kulin & Johansson Sevä, 2021; Tam & Chan, 2018). In industrialized zones of Jaipur, awareness might be coined by the regulations imposed on the environment, inspections or local environmental concerns, leading conservation as the more concrete and palpable reaction to one's perception of the environment compared to abstract

consciousness.

Meanwhile, the moderate impact on environmental consciousness indicates that just being aware does not imply a strong change of values; instead, in some business holders it could result into a pragmatic and compliance-oriented approach. This nuance is consonant with literature highlighting how values, moral norms and identity plays a crucial role in maintaining pro environmental behaviour beyond instrumental considerations (Binder et al., 2020; Begum et al., 2021). The outcomes indicate that certain items relating to high endorsement of statements are measured by high responses while others are measured by less, and that consciousness of concern is distributed unevenly across different environmental concerns, which aligns with gaps between expressed concern and consistent behaviour that have been found with generational studies (Mergelmeyer, 2019).

To sum up, the results discussion here suggests that environmental awareness is a strong instrument for encouraging conservation behaviour from industrial actors in Jaipur but a weaker instrument for raising their deeper consciousness. This finding supports and builds upon previous organizational studies, which provide evidence that it is possible for the awareness-raising process to evoke direct behavioural changes even if there is only partial or uneven attitudinal change.

This study proposed and evaluated a structural model between environmental awareness, environmental consciousness and environmental conservation behaviour of businessmen and industrial units of industrial areas of Jaipur. The analysis using SEM with 200 respondents showed that environmental awareness significantly explained environmental consciousness and conservation behavior, and had a stronger influence on the conservation behavior. The product of measuring model showed that every latent construct is mainly determined by a subset of strong indicators, which are the possible space for scale refinement.

The results collectively highlight the pivotal function

of awareness in driving pro environmental results in the industrial domain. Awareness leads to more environmental consciousness, and it seems to translate even more strongly into environmental conservation, presumably because of the clear operational and regulatory impacts that business owners see. So the study showed that, awareness based intervention is relevant in the environmental management of industrial organization and it also showed that, one need to involve deeper values and identity for sustainable environmental management.

5 STUDY IMPLICATIONS

In practical terms, the findings have implications for policy and management in industrial areas, both within and outside the EU. Therefore, given the strong linkages from awareness to conservation behaviour, environment awareness campaigns focused on industrial business owners (both through workshops and communication with the regulators and through creation of guidelines and sector associations) should lead to concrete changes in conservation behaviour. Second, environmental training and green capacity building programmes can be developed to reinforce aspects of environmental consciousness, including values, moral responsibility and identity, to facilitate more lasting attitudinal change. Third, more intelligent than regulation, the insights gained by these regulators and local authorities can incorporate awareness raising aspects into environmental compliance plans, with an understanding that a business owner who is aware is more likely to take measures to conserve.

6 FUTURE SCOPE OF THE STUDY

For future research, there are several possibilities. There is a potential need to revise and/or replace some items at each scale as they are weak indicators; if these are improved, confirmatory factor analysis and item response analysis can be employed in future studies to enhance the scales and test their invariance in different sectors and cities. Longitudinal designs would enable investigation of changes in awareness over time and its role in consciousness and conservation behaviour, which Robert suggests may

be causal as suggested in the cross sectional SEM. Moreover, the inclusion of possible mediating and moderating factors, such as the environmental identity, general trust, perceived behavioural control, and organisational culture (Tam & Chan, 2018; Wang et al., 2021; Blok et al., 2015) in the model could give more comprehensive models of industrial pro environmental behaviour. The study needs to be expanded to other industrial cities and other types of corporations (owner managed and professionally managed) to enrich the knowledge about the operation of awareness and consciousness in various industrial governance formats.

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