Testing the Competency-Behavior Link: Sustainability Learning Outcomes Among Accounting Professionals in Sri Lanka

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Abstract

This study challenges the conception that competencies acquired through sustainability learning (SL) automatically lead to pro-sustainable behaviour (PSB) and empirically tests how sustainability competencies translate into behaviour through mediation by individual and group attributes. Drawing on the Key Competency Framework and integrating behavioural perspectives from the Theory of Planned Behaviour (TPB), Norm Activation Model (NAM), and Value-Belief-Norm (VBN) theory, this study develops and tests a mediated competency–behaviour model. Specifically, this research examines the five key sustainability competencies identified by Wiek et al. (2011), systems thinking, anticipatory thinking, normative thinking, strategic thinking, and interpersonal thinking, and pathways to PSB through attitudes, subjective norms, perceived behavioural control, personal norms, and biospheric values. An empirical study was conducted among accounting professionals in Sri Lanka (n = 198) using a structured online questionnaire, and data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The results revealed a statistically significant effect of normative thinking, strategic thinking and interpersonal thinking on PSB through behavioural mediators, with no significant effect of systems thinking and anticipatory thinking. These findings highlight that sustainability competencies do not uniformly translate into behaviour and indicate the importance of behavioural activation mechanisms in converting learning outcomes into practice.

Keywords: Pro-sustainable Behaviour, Sustainability Learning, Key competencies, Behavioural Mediation, Accounting Professionals.

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Introduction

The extreme climate disaster, Storm Ditwah, which affected Sri Lanka and several Asian countries, has opened the eyes of communities both locally and globally to escalating extreme climate-related risks and strongly emphasised that sustainability is no longer a choice, but it is a necessity (IPCC, 2023). As a Sri Lankan from a country repeatedly affected by such climate disasters, such as large rainfalls, landslides, widespread floods, displacement of communities, and loss of life, significantly highlighted the impact of environmental degradation, unsustainable land use, weak water-management systems, and unplanned urbanisation. These outcomes highlight the long-standing issues within sustainability discourse, such as ecosystem depletion, pollution, water mismanagement, and climate adaptation failures, which are no longer hypothetical concepts but lived realities. Storm Ditwah therefore reminded the necessity of translating sustainability learning into decisive policy action, and responsible individual, group and professional behaviour, particularly in climate-vulnerable developing economies.

Sustainability learning (SL) refers to acquisition of knowledge, skills, and attitudes, collectively referred to as competencies, through both formal and informal learning processes (Fekih Zguir et al., 2021;). Prior studies have identified an array of competencies associated with sustainability, reflecting variations in how scholars conceptualise the capabilities required to achieve sustainability-related goals (Wesselink et al., 2010; Rieckmann, 2012). Consequently, few SL frameworks have emerged, and among these conceptual models, Wiek et al.'s (2011) Key Competency Framework (KCF) has been acknowledged most. The KCF identifies five key competencies as essential for achieving sustainability targets listed below:

Table 1. Key Competency Framework

Competency	Focus	Reference
Systems thinking	Understanding the interconnections and interdependencies within complex socio-ecological systems	Alberton et al., 2022; Molderez & Ceulemans, 2018
Anticipatory thinking	Envisioning and preparing for future scenarios	Wiek et al.,2011
Normative thinking	Integrates ethical principles and sustainability values	Venn et al., 2022; Alm et al., 2022; Alberton et al.,2022
Strategic thinking	Design and implementation of sustainability-oriented interventions	Barth et al.,2007
Interpersonal thinking	Collaboration and engagement among diverse stakeholders	Alm et al., 2022; Alberton et al.,2022

Source: Authors' compilation

Although many higher education institutions have explicitly defined these competencies as intended learning outcomes and incorporated into their curricula (Aleixo et al., 2018), empirical evidence indicates that learning alone is insufficient to transform pro-sustainable behaviour (Colombo et al., 2023). This highlights a critical limitation of outcome-based SL and reinforces the need to examine how SL competencies translate into actual pro-sustainable behaviour.

Pro-sustainable behaviour (PSB) is the concept that is understood as a set of intentional and effective behaviours, that protect natural resources and enhance the well-being of current and future generations, while recognising the interconnectedness of social, economic and environmental systems (Lee et al., 2020; Cunningham et al., 2020). Psychological constructs, which include subjective norms (Razak & Sabri, 2019), personal identity (Kim & Seock, 2019; Lai & Chang, 2020), and control beliefs (Ajibade & Boateng, 2021) and various group-level factors, cultural views (Lee et al., 2020), institutional policies (Steg, 2016), socio-demographic variables (Zebardast & Radaei, 2022), Cost considerations (Schleiden & Neiberger, 2020), and communication (Steg, 2016) constitute the antecedents of PSB. Regardless of the thorough recognition of these antecedents, SL as a direct antecedent of PSB has not been incorporated into the scope of prior research, creating a large amount of theoretical disconnect between behavioural theories and SL competency frameworks. This gap highlights the knowledge-action gap, where the connection between learning and behaviour is neither linear nor automatic (Colombo et al., 2023).

While there have been some recent attempts to link sustainability competencies with behavioural constructs (refer to Perera & Patabendige, 2025), there is limited, and often contradictory, evidence. It generally assumes that competencies have fairly consistent impacts on behaviour. However, little research has been devoted to examining if the various sustainability competencies trigger different behavioural processes and have different impacts on PSB (Wiek et al., 2011; Rieckmann, 2012). Moreover, insufficient emphasis has been placed on explaining how competencies acquired through SL translate into action through attitudinal, normative, moral and control processes. This reflects the broader knowledge–action gap, where sustainability awareness and competency development do not necessarily result in behavioural transformation (Kollmuss & Agyeman, 2002; Colombo et al., 2023). This becomes especially relevant in a professional setting, where organisational practices and institutional constraints, as well as decision-making authority, can influence how sustainability competences are manifested at the individual level. To tackle this, it is important to shift the perspective from "static learning outcomes" to "behavioural processes" related to sustainability competencies. Previous research has mainly been directed towards competency building and awareness of sustainability, while the translation of competencies into action (behaviour) has received limited attention (Redman & Wiek, 2021; Salovaara & Soini, 2021).

It is especially relevant to the accounting profession, where the profession is evolving from being mere financial record keepers to playing a much more strategic role in governance, sustainability disclosures, performance management and long-term value creation (ACCA, 2025). As a result, accountants have become increasingly influential on the sustainability practices of organisations, not only as a reporter but also as an adviser (Bebbington & Unerman, 2018). Despite this shift in practice, little empirical research has explored the relationship between sustainability competencies and behaviour in this professional group. Further, it becomes more important in developing economy contexts like Sri Lanka, as there are several vulnerabilities, institutional

constraints, and resource limitations in implementing sustainability (IPCC, 2023). In these contexts, it is not likely that the translation of SL into behaviour will be automatic, and it may rely on other behavioural and contextual factors.

Moreover, the literature on SL has mostly focused on competencies identified as learning outcomes that are assumed to have a direct impact on sustainability-oriented action (Wiek et al., 2011; Redman & Wiek, 2021). There is, however, a major theoretical restriction to this assumption: competencies do not necessarily result in behaviours (Kollmuss & Agyeman, 2002; Colombo et al., 2023). Competency may lead to strength cognitive understanding and ethical awareness, strategic capacity and collaborative ability, but these capacities remain behaviourally dormant until they are activated by underlying psychological and social mechanisms (Ajzen, 1991; Schwartz, 1977; Stern, 2000). From a behavioural point of view, sustainability competences are thus not sought after directly as behaviours, but as potential (latent) capacities to behave in a pro-sustainable way that need to be reinforced, morally internalised, perceived as possible, and legitimised in society before they can be expressed in actual sustainable behaviour (Steg & De Groot, 2012; Bamberg & Möser, 2007). It is a theoretical move that takes competencies from learning achievements to behaviourally activated mechanisms that exist in larger psychological and social contexts.

Against this backdrop, the present study integrates sustainability competency perspectives with the Theory of Planned Behaviour, Norm Activation Model, and Value-Belief-Norm Theory to examine how sustainability competencies translate into PSB through individual and group-level behavioural attributes. By linking competency-based learning with behavioural processes, the study provides a more integrated explanation of how SL is operationalised within professional environments. Accordingly, this study addresses the research question of "How are sustainability competencies translated into PSB through individual and group-level behavioural mechanisms among accounting professionals in a developing economy context?"

Literature Review

Understanding how SL translates into PSB requires an integrated theoretical framework that combines competency models with behavioural processes. Yet, literature has been extensively explored on sustainability competencies (Wiek et al., 2011), behavioural determinants (Ajzen, 1991; Schwartz, 1977; Steg, 2016), and organisational or contextual determinants; these strands have developed largely in isolation. However, the lack of integrative theory limits our understanding of how learning-based competencies transform into internal desires, social pressures, moral imperatives and eventually sustainable behaviours. This study addresses this gap by hypothetically addressing and empirically testing this integrated conceptualisation: SL develops five key competencies that only become behaviourally effective when mediated by individual psychological constructs and collective value systems. This interconnected perspective brings together cognitive, ethical, anticipatory, strategic, and interpersonal capacities with attitudes, subjective norms, perceived behavioural control, personal norms, and biospheric values to predict PSB.

Sustainability Learning and Competency Foundations

Sustainability learning (SL) refers to educational and experiential processes that develop the cognitive, affective, and action-oriented capacities needed to address environmental, social, and economic challenges. Scholars generally describe SL as a holistic learning experience that develops awareness, systems understanding, value development and prospective thinking (Fekih Zguir et al., 2021; Caniglia et al., 2017). Following the demands of global sustainability, higher education institutions gradually integrate SL into their curricular models to prepare individuals to address the sustainability challenges of the real world (Aleixo et al., 2018). However, empirical evidence shows that though SL does increase knowledge and awareness, it is yet to be seen how it can translate into behavioural change. Many students who carry a strong sustainability awareness and yet do not always show sustainability-oriented behaviour outside the academic settings are substantial (Olsson et al., 2022). This long-standing awareness-action gap reminds us of the need to understand how competencies develop into behavioural levers.

The model described by Wiek et al. (2011) is the most acknowledged framework among the existing competency frameworks. This model lists five major sustainability competencies, namely systems thinking, anticipatory thinking, normative thinking, strategic thinking and interpersonal thinking, providing a systematic taxonomy of the competencies necessary to address sustainability complexity. However, critics argue, though, that these competencies, informative of pedagogical design, are inadequate in the context of psychological and social mechanisms to actualise behaviour (Redman & Wiek, 2021; Salovaara & Soini, 2021). Furthermore, although the five competencies identified in the Key Competency Framework are treated as equally important, emerging research suggests that these competencies may not contribute uniformly to behavioural outcomes (Brundiers et al., 2021; Redman & Wiek, 2021). Different competencies may activate different psychological and social mechanisms, which in turn might produce varying degrees of effectiveness of behaviour (Salovaara & Soini, 2021; Perera & Patabendige, 2026). This emphasises the significance of understanding the varied route of individual competencies in shaping pro-sustainable behaviour.

Integrating Competencies with Behavioural Determinants

This paper contributes to the integration by connecting each competency to defined behavioural drivers that are entrenched in major behavioural theoretical models: the Theory of Planned Behaviour (TPB), the Norm Activation Model (NAM), and the Value-Belief-Norm (VBN) Theory. All these frameworks assume that behaviour is a combination of attitudes, subjective norms, perceived behavioural control, personal moral obligations and biospheric values (Ajzen, 1991; Schwartz, 1977; Stern, 2000). Through the placement of each competency in these behavioural tracks, the study reorganises competencies in abstract learning outcomes into concrete behavioural pathways.

Systems Thinking and Attitudinal Mediation

Systems thinking emphasises the understanding of interdependencies in socio-ecological systems (Sterling, 2011; Molderez & Ceulemans, 2018), by which increasing the awareness of environmental impacts. However, the empirical evidense show that awareness does not necessarily translate to behavioural action (Kollmuss & Agyeman, 2002). Systems thinking is behaviourally

effective only when it combines with strong biospheric values, intensely held moral beliefs concerning the inherent value of ecosystems (Steg et al., 2005). Individuals, who perceive systemic vulnerability and also appreciate ecological conservation are more likely to practice sustainably. At the group level, subjective norms further support system-based reasoning. When sustainability becomes a socially endorsed behaviour, individuals align their actions with collective expectations (Boström et al., 2018; Marzouk, 2019). In its turn, Integrated Systems Thinking evolves when systems cognition intersects with biospheric concern and subjective norms, enabling individuals to move from awareness to purposeful, socially reinforced behaviour. Since systems thinking promotes environmental awareness but the awareness in itself is not adequate without the evaluative judgement and social reinforcement, this study hypothesises:

H1: Systems thinking competency, mediated by biospheric values and subjective norms, positively influences pro-sustainable behaviour among accounting professionals.

Anticipatory Thinking and Perceived Behavioral Control

Anticipatory thinking involves foresight, scenario planning, and understanding long-term sustainability implications (Wiek et al., 2011). Empirical studies show that future-oriented reasoning predicts intention to adopt greener lifestyles, sustainable technologies, and low-carbon behaviours (Brundiers et al., 2021). However, anticipatory insight must translate into actionable commitment. TPB identifies perceived behavioural control as a core driver: individuals act only when they believe they can successfully perform the behaviour (Ajzen, 1991). Meta-analyses confirm Perceived Behavioural Control as a strong determinant of pro-environmental behavioural consistency (Yuriev et al., 2020). Likewise, positive attitudes toward future-oriented decisions amplify intention. Studies show that anticipating long-term environmental consequences strengthens pro-sustainability attitudes (Lüdeke-Freund et al., 2019). Therefore, Actionable Anticipatory Thinking emerges when foresight aligns with attitudes and perceived behavioural control, enabling individuals not only to imagine sustainable futures but also to feel capable and motivated to act. Since anticipatory thinking requires both attitudinal conviction and perceived capability to translate foresight into action, this study hypothesises:

H2: Anticipatory thinking competency, mediated by attitude and perceived behavioural control, positively influences pro-sustainable behaviour among accounting professionals.

Normative Thinking and Moral Obligation

Normative thinking involves ethical reasoning, value-based judgement, and reflection on moral obligations (Remington-Doucette et al., 2013; Alberton et al., 2022). Moral beliefs and ethical considerations are paramount in the sustainability behaviour, which has been demonstrated through the research on responsible consumption behaviour, recycling behaviours and environmental citizenship behaviour (Steg & De Groot, 2012). Attitudes based on moral evaluations have been shown to predict environmental intentions more strongly than rational or utilitarian evaluations (Bebbington & Unerman, 2018). Subjective norms also reinforce normative commitments; individuals tend to adopt behaviours that align with socially accepted moral expectations (Smith & Louis, 2008). When sustainability is framed as a moral duty endorsed by

society, individuals feel a stronger obligation to act (Balderjahn et al., 2013). As a result, Principle-Driven Normative Thinking is the combination of ethical thinking, moral attitudes and social reinforced expectation thus providing the operationalisation of ethical principles. As normative thinking operates through moral evaluation and socially reinforced ethical expectations, this study hypothesises:

H3: Normative thinking competency, mediated by attitude and subjective norms, positively influences pro-sustainable behaviour among accounting professionals.

Strategic Thinking and Efficacy Beliefs

Strategic thinking is future-oriented planning that translates sustainability objectives into operational actions. Research shows that strategic competence enhances the development of sustainability governance, resource optimisation, and long-term planning (Warren et al., 2014). However, strategic thinking requires favourable behavioural processes. The perceived behavioural control in their behaviours is essential in enabling people to feel themselves in a position to execute sustainability strategies (Barth et al., 2007). At the same time, personal norms, internalised moral obligations, are also strong predictors of sustainable behaviours in various situations (Bamberg & Moser, 2007). The past studies suggest that when individuals feel a moral obligation to act and believe that they have control, strategic intentions become converted into behaviour (Gamage et al., 2021; Niu et al., 2023). Behavioural Strategic Thinking thus integrates planning, perceived capability, and moral obligation. The proposed study is based on the following hypothesis: Since the efficacy of strategic planning is conditional on the perceived capability and internalised moral duty, the study hypothesises:

H4: Strategic thinking competency, mediated by perceived behavioural control and personal norms, positively influences pro-sustainable behaviour among accounting professionals.

Interpersonal Thinking and Collective Values

Interpersonal competence reflects the ability to negotiate, communicate, empathise, and collaborate in sustainability contexts (Alberton et al., 2022; Alm et al., 2022). The challenges of sustainability are a communal effort requiring shared commitment and coordinated action. Biospheric values increase the motivation of individuals to interact with other people on environmental matters, and personal norms influence cooperative moral expectations in groups (Steg et al., 2005; Cegarra-Navarro et al., 2021). Collective sustainability action is powerful in cases whereby the members of the group have a common set of values and norms that drive the interpersonal processes that include dialogue and collective problem-solving. Therefore, Collaborative Interpersonal Thinking connects interpersonal capability and mutual moral and environmental values to energise collective pro-sustainable behaviour. As collaborative competence presupposes values of shared environment and collective moral expectations, this study hypothesises:

H5: Interpersonal thinking competency, mediated by biospheric values and personal norms, positively influences pro-sustainable behaviour among accounting professionals.

Methodology

This research tests the relationships between sustainability competencies identified by Wiek et al. Behaviour (2011) and PSB through mediation by individual and group behavioural attributes derived from three major behavioural theories: TPB, NAM, and VBN. Specifically, this research paper discusses how five competencies, systems thinking, anticipatory thinking, normative thinking, strategic thinking, and interpersonal thinking influence PSB due to their correlations with attitude, subjective norm, perceived behavioural control, personal norms and biospheric values. PSB is operationalised in three dimensions, which include pro-environmental behaviour, pro-social behaviour, and pro-economic behaviour. The empirical tests of these competency-behaviour pathways are the five hypotheses that were extrapolated based on the literature review.

The population for this study comprised accounting professionals in Sri Lanka, those who have obtained professional accounting membership from CA Sri Lanka, CMA Sri Lanka, ACCA and CIMA (UK). A convenience sampling method was used to collect the data, which resulted in 198 accounting professionals. The use of convenience sampling through professional networks via email and WhatsApp may create the potential for self-selection bias, as respondents with a greater interest or awareness of sustainability issues may have been more likely to participate. The initial contact list was developed using professional and academic networks, including members affiliated with professional accounting bodies and industry contacts. Non-response bias was assessed by comparing early and late respondents, and no statistically significant differences were observed, suggesting that non-response bias is unlikely to affect the results substantially.

The measurement items included in the questionnaire was structured into four parts and were adapted from previously validated studies and contextualised to align with the sustainability and professional accounting context of Sri Lanka. Minor wording changes were introduced to ensure the relevance to the context of accounting professionals and accounting for sustainability in professional practice in Sri Lanka. The questionnaire was additionally also reviewed for clarity and appropriateness for the context before distribution. Part A covered demographics and general sustainability knowledge questions. Part B dealt with competencies acquired through SL and each competency is evaluated using four questions. Systems thinking is assessed using a bipolar scale with ratings from 1 to 5. The other four competencies (anticipatory thinking, normative thinking, strategic thinking, and interpersonal thinking) are assessed through a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5) (Alm et al., 2022). Part C dealt with PSB, which consist with 20 questions and the responses were captured using a five-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree") (Chakraborty et al., 2017; Bhattacharya, 2019; Chan et al., 2022). Mediating constructs were measured with five-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree") in part D in covering attitude with five questions (Chan et al., 2022), subjective norm with three questions (Rezaei & van der Heijden, 2022), perceived behavioural control with three questions (Chan et al., 2022), personal norm with six questions (He & Zhan, 2018) and biospheric vales with three questions (Whitley et al., 2018).

The questionnaire was created in the Google platform and distributed using WhatsApp and email. The respondents were advised to abide by the survey directions and assured complete anonymity. The survey was therefore considered to be informed consent to complete the survey.

Invitations were dispatched to 379 respondents, and 198 usable responses were returned, representing a 54% response rate. This is quite high in terms of online surveys, which usually have low response rates (Nayak & Narayan, 2019). Though there was no missing data, total responses n=198 were employed for analysis through Smart PLS. The recommended procedures for mediation analysis (Hair et al., 2020) were followed to analyse the data using a Partial Least Squares Structural Equation Modelling (PLS-SEM) process in the software package SmartPLS-4.

In terms of demographics, 97 (49%) respondents were female, and 101 (51%) were male. As the gender representation was almost equal, it indicates that the data set has captured the views from both male and female accounting professionals fairly. In addition, 62.6% of respondents were aged above 30 years, and the mean age was in the age group 31–40 years. Professional accounting membership was common amongst all respondents, and more than 90% had a middle level or higher designation, meaning that the sample consists of experienced practitioners who can implement sustainability practices in their organisations.

The respondents comprised a broad spectrum of industry segments such as audit and assurance firms, corporate organisations and public sector institutions. Moreover, most respondents had several years of professional experience, enhancing the validity of the sample to address sustainability-related decision-making. While specific measures of sustainability training exposure were not explicitly captured, it is acknowledged that varying levels of exposure to sustainability-related knowledge and practices may influence behavioural outcomes, and this is recognised as a limitation of the study.

Ethical considerations were observed throughout the study. Prior to data collection, ethical clearance was obtained from the Ethics Review Committee of the University of Kelaniya and participation was voluntary, respondents were assured of anonymity and confidentiality, and completion of the questionnaire was treated as informed consent to participate in the study.

Given that all variables were collected using a single survey instrument, common method bias (CMB) was assessed using both Harman's single-factor test and full collinearity assessment. The unrotated factor solution revealed that the first factor accounted for 23.324% of the total variance, which is below the recommended threshold of 50%, indicating that common method bias is unlikely to be a significant concern. Furthermore, the full collinearity assessment showed that all VIF values (Table 5). ranged between 1.000 and 1.990, remaining well below the recommended threshold of 3.3, further confirming the absence of substantial common method bias in the study.

Analysis

To ensure robustness, both reliability and validity of the reflective measurement model were tested. As shown in Table 2: Factor loadings, Cronbach's alpha, Composite Reliability, and Average Variance Extracted. Factor loadings (FL) of all items are above 0.6, except FL for Perceived Behavioural Control- Q18.1 (0.544), which fell below the standard threshold but was retained as it is above 0.5 (Hair et al., 2020). Cronbach's alpha values ranged from 0.648 to 0.922, and composite reliabilities ranged from 0.642 to 0.930, confirming acceptable internal consistency. Convergent validity was demonstrated through average variance extracted (AVE) scores above

0.50. Discriminant validity was assessed using the HTMT criteria as shown in Table 3: HTMT Ratio, which was also satisfactory as all the values are below 0.85.

Table 2. Reflective Measurement Model

Constructs	Item	Sample (n=198)			
		FL	**CR**	**α**	**AVE**
Pro-Sustainable Behaviour- PSB	DV1	0.751	0.648	0.642	0.582
	DV2	0.729			
	DV3	0.806			
System Thinking	IV1	1.000			
Anticipatory Thinking	IV2	1.000			
Normative Thinking	IV3	1.000			
Strategic Thinking	IV4	1.000			
Interpersonal Thinking	IV5	1.000			
Attitude	Q16.1	0.895	0.933	0.930	0.782
	Q16.2	0.903			
	Q16.3	0.840			
	Q16.4	0.929			
	Q16.5	0.852			
Subjective Norm	Q17.1	0.883	0.794	0.752	0.670
	Q17.2	0.875			
	Q17.3	0.683			
Perceived Behaviour Control	Q18.1	0.544	0.790	0.687	0.601
	Q18.2	0.889			
	Q18.3	0.846			
Personal Norm	Q19.1	0.894	0.922	0.917	0.753
	Q19.2	0.890			
	Q19.3	0.831			
	Q19.4	0.931			
	Q19.5	0.784			
Biospheric Values	Q20.1	0.904	0.860	0.851	0.771
	Q20.2	0.894			
	Q20.3	0.835			

Note: *FL= Factor Loading, a = Cronbach Alpha, CR = Composite Reliability, AVE = Average Variance Extraction*

Source: Authors' compilation

Table 3. HTMT Ratio

Sample n= 198	ATT	BV	IV1	IV2	IV3	IV4	IV5	PBC	PN	PSB	SN
ATT											
BV	0.530										
IV1	0.124	0.077									
IV2	0.305	0.228	0.025								
IV3	0.479	0.321	0.038	0.523							
IV4	0.489	0.319	0.005	0.473	0.533						
IV5	0.487	0.352	0.080	0.413	0.584	0.483					
PBC	0.552	0.315	0.061	0.269	0.415	0.314	0.530				
PN	0.490	0.329	0.026	0.280	0.400	0.350	0.468	0.618			
PSB	0.668	0.493	0.088	0.255	0.576	0.416	0.695	0.704	0.689		
SN	0.725	0.377	0.120	0.291	0.478	0.436	0.523	0.699	0.617	0.765	

Note: *IV1-Systems Thinking, IV2-Anticipatory Thinking, IV3-Normative Thinking, IV4-Strategic Thinking,IV5-Interpersonal Thinking, ATT- Attitude, SN- Subjective Norm, PBC- Perceived Behavioural Control, BV-Biospheric Values, PN- Personal Norms*

Source: Authors' compilation

SmartPLS was employed to validate the structural model, applying 5,000 bootstrap resamples for robustness. The explanatory power of the model is reported in Table 4 :R-Value, which shows that SL explains approximately 45% of the variance in PSB ($R^2 = 0.454$; adjusted $R^2 = 0.440$). While this represents moderate explanatory power based on Cohen's (2013) guidelines, it confirms that SL, connecting with individual and group behavioural attributes, makes a meaningful contribution to behavioural outcomes.

Table 4. R-Value

	Sample (n=198)	
	R-square	**R-square adjusted**
PSB	0.454	0.440
ATT	0.218	0.210
SN	0.250	0.242
PBC	0.102	0.093
PN	0.113	0.104
BV	0.117	0.108

Source: Authors' compilation

Note: *ATT- Attitude, SN- Subjective Norm, PBC- Perceived Behavioural Control, BV-Biospheric Values, PN- Personal Norms, PSB- Pro-Sustainable Behaviour*

In addition to R^2, effect size (f^2) values were assessed to examine the relative contribution of each predictor construct to pro-sustainable behaviour, as presented in Table 5: VIF Assessment and Effect Size (f^2). The findings indicate negligible to moderate effect sizes, suggesting that more than a single dominant predictor, PSB is influenced by multiple interrelated psychological, contextual and social factors (Ajzen, 1991; Bamberg & Möser, 2007). In behavioural and sustainability-related research, small or negligible effect sizes are common due to the complexity of human decision-making and the indirect nature of behavioural transformation processes (Hair et al., 2020). However, the combined explanatory power of the constructs demonstrates meaningful behavioural relevance within the proposed model, despite the relatively small individual contributions.

Table 5. VIF Assessment and F2 size effect

Predictor	VIF	f-square	Effect Size
IV1 -> BV	1.006	0.011	Negligible effect
IV1 -> PN	1.000	0.000	Negligible effect
IV2 -> ATT	1.376	0.005	Negligible effect
IV2 -> PBC	1.288	0.017	Negligible effect
IV3 -> ATT	1.376	0.169	Medium
IV3 -> SN	1.517	0.050	Small
IV4 -> PBC	1.288	0.045	Small
IV4 -> PN	1.000	0.128	Medium
IV5 -> BV	1.006	0.127	Medium
IV5 -> SN	1.517	0.091	Small
ATT -> PSB	1.958	0.020	Small
BV -> PSB	1.303	0.015	Negligible effect
PBC -> PSB	1.671	0.050	Small
PN -> PSB	1.633	0.059	Small
SN -> PSB	1.990	0.032	Small

Source: Authors' compilation

Note: *SRMR<0.08*

Model fit was assessed using the Standardised Root Mean Square Residual (SRMR), as presented in Table 6: Model Fit. The SRMR value for the saturated model was 0.061, which is below the recommended threshold of 0.08, indicating an acceptable model fit (Hair et al., 2020).

Hypothesis Testing

The relationships were analysed using 5000-sample bootstrap results summarised in Table 7: Hypothesis Testing (direct relationships), which presents the path coefficients, t-values, and p-values. The structural model path coefficients for Hypotheses H1 to H5 were evaluated, as illustrated in Figure 1, providing estimated path coefficients from sustainability competencies to PSB through the individual and group behavioural attributes. Overall, the structural model explains 45.4% of the variance in PSB (R 2 = 0.454), providing strong empirical support that sustainability competencies become behaviourally effective if they are mediated by attitudinal, control-related, and normative processes.

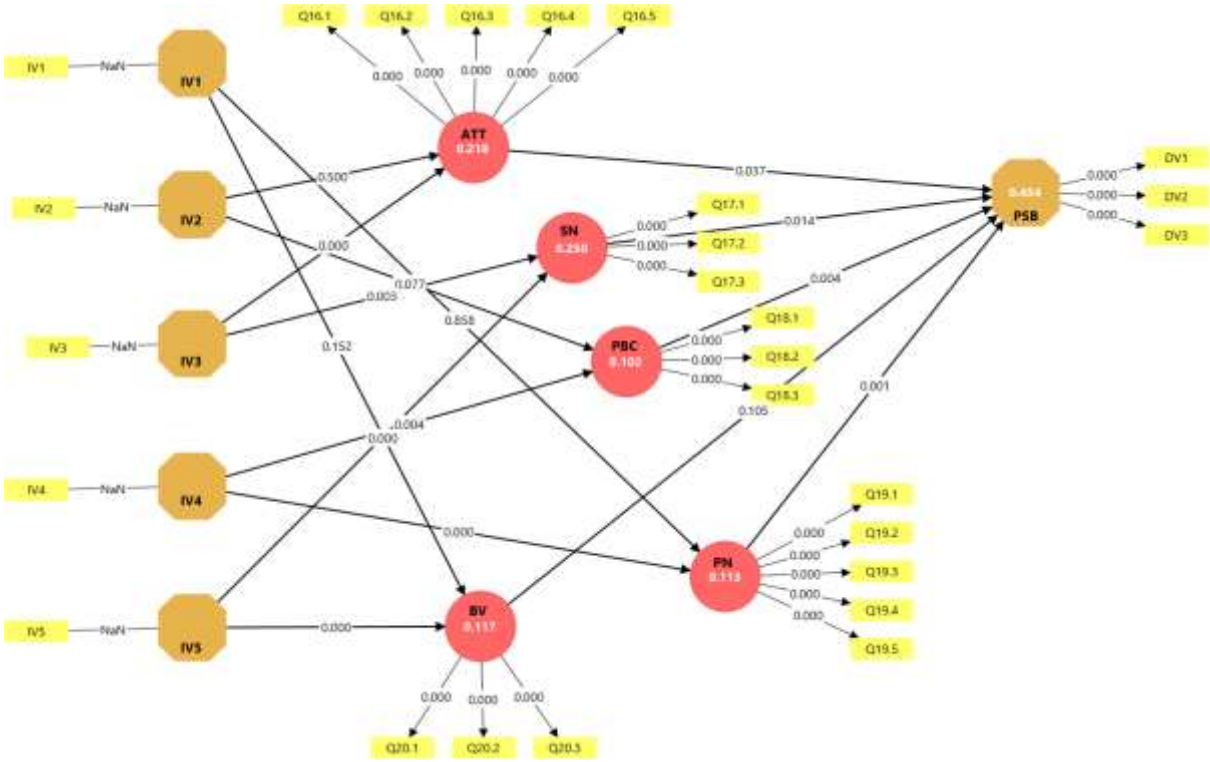

Figure 1. PLS-SEM path coefficient model estimation for each competency

Source: Authors' development

Table 7: Hypothesis Testing (direct relationships) presents the direct relationships among the variables in the structural model. Specifically, normative thinking (IV3) demonstrated significant positive relationships with attitude (β = 0.427, p = 0.000) and subjective norms (β = 0.238, p = 0.003). Similarly, strategic thinking (IV4) showed significant associations with perceived behavioural control (β = 0.228, p = 0.004) and personal norms (β = 0.337, p = 0.000). Interpersonal thinking (IV5) also demonstrated significant positive relationships with biospheric values (β = 0.336, p = 0.000) and subjective norms (β = 0.322, p = 0.000). In contrast, systems thinking (IV1) did not demonstrate significant relationships with biospheric values (β = -0.099, p = 0.152) or personal norms (β = 0.012, p = 0.858). Likewise, anticipatory thinking (IV2) did not show significant relationships with attitude (β = 0.071, p = 0.500) or perceived behavioural control (β = 0.141, p = 0.077).

Furthermore, several behavioural mediators demonstrated significant direct relationships with PSB, particularly attitude (β = 0.146, p = 0.037), perceived behavioural control (β = 0.213, p = 0.004), personal norms (β = 0.230, p = 0.001), and subjective norms (β = 0.187, p = 0.014). In contrast, biospheric values did not demonstrate a significant direct relationship with PSB (β = 0.103, p = 0.105). Overall, the findings confirm that sustainability competencies influence PSB through differentiated attitudinal, normative, moral, and control-related pathways.

Table 6. Model Fit

	Saturated model	**Estimated model**
SRMR	0.061	0.191

Source: Authors' compilation

Table 7. Hypothesis Testing (Direct Relationships)

Hypothesis	**β**	**T**	**P**	**Relationship**
ATT -> PSB	0.146	2.089	0.037	Supported
BV -> PSB	0.103	1.620	0.105	Not Supported
PBC -> PSB	0.213	2.894	0.004	Supported
PN -> PSB	0.230	3.406	0.001	Supported
SN -> PSB	0.187	2.454	0.014	Supported
IV1 -> BV	-0.099	1.433	0.152	Not Supported
IV1 -> PN	0.012	0.179	0.858	Not Supported
IV2 -> ATT	0.071	0.675	0.500	Not Supported
IV2 -> PBC	0.141	1.770	0.077	Not Supported
IV3 -> ATT	0.427	6.073	0.000	Supported
IV3 -> SN	0.238	2.961	0.003	Supported
IV4 -> PBC	0.228	2.858	0.004	Supported
IV4 -> PN	0.337	4.996	0.000	Supported
IV5 -> BV	0.336	5.594	0.000	Supported
IV5 -> SN	0.322	4.600	0.000	Supported

Source: Authors' compilation

Note: *β = Path Coefficient, T = T Statistics, P = P Value, p < 0.05, Significance was assessed using 5,000* bootstrap samples and 95% confidence intervals.

Mediation effects were further assessed by examining the indirect effects of sustainability competencies on PSB through the proposed mediators, presented in Table 8: Hypothesis Testing. Notably, significant effect on PSB was demostarted by with Normative thinking -IV3 (β = 0.107, t = 2.939, p = 0.003), Strategic Thinking - IV4 (β = 0.126, t = 3.364, p = 0.001), and Interpersonal

thinking -IV5 (β = 0.095, t = 2.259, p = 0.024) via individual and group behavioural attributes, confirming hypothesis H3, H4 and H5. In contrast, the remaining two competencies, systems thinking – IV1 (β = -0.007, t = 0.364, p = 0.716) and anticipatory thinking – IV2 (β = 0.040, t = 1.282, p = 0.200), did not demonstrate statistically significant effects, revealing that the individual and group attributes examined may not fully mediate these particular competency-behaviour relationships.

Table 8. Hypothesis Testing

Hypothesis		β	T	P	Relationship
H1	IV1 -> PSB	-0.007	0.364	0.716	Not Supported
H2	IV2 -> PSB	0.040	1.282	0.200	Not Supported
H3	IV3 -> PSB	0.107	2.939	0.003	Supported
H4	IV4 -> PSB	0.126	3.364	0.001	Supported
H5	IV5 -> PSB	0.095	2.259	0.024	Supported

Source: Authors' compilation

Note*: β = Path Coefficient, T = T Statistics, P = P Value, p < 0.05*

Following the evaluation of the structural model, an Importance–Performance Map Analysis (IPMA) was conducted to further strengthen the practical relevance of the study (Hair et al., 2020). The analysis examined the relative importance and performance of the five independent variables (IV1–IV5) together with the mediating constructs, namely attitude,subjective norms, perceived behavioural control, personal norms, and biospheric values, in predicting pro-sustainable behaviour, as presented in Table 9: IPMA. Personal norms (0.230), perceived behavioural control (0.213), and subjective norms (0.187) are reported to have the highest importance values and were thus highlighted as priority areas for behaviour change within the model. Among the sustainability competencies, strategic thinking (IV4) (0.126), normative thinking (IV3) (0.107), and interpersonal thinking (IV5) (0.099) demonstrated moderate importance with satisfactory performance levels, suggesting that they are meaningful and contribute towards behavioural transformation. In contrast, systems thinking (IV1) (-0.007) and anticipatory thinking (IV2) (0.040) demonstrated relatively low importance, suggesting a comparatively weaker influence on PSB within the present model.

Table 9. IPMA

	Importance	Performance	Priority
IV1	-0.007	51.111	Low
IV2	0.040	89.015	Low
IV3	0.107	72.944	Moderate
IV4	0.126	75.788	Moderate
IV5	0.099	65.978	Moderate

ATT	0.146	81.001	Moderate
BV	0.103	87.296	Moderate
PBC	0.213	69.525	High
PN	0.230	75.200	High
SN	0.187	70.989	High

Source: Authors' compilation

Note: *Importance Low < 0.005, Importance Moderate between 0.005–0.15, Importance high > 0.15*

Following the assessment of the structural model and hypothesis testing, the out-of-sample predictive performance of the model was evaluated using the PLSpredict procedure in SmartPLS 4 with a 10-fold cross-validation approach (Shmueli et al., 2016). The analysis specifically focused on PSB as the target endogenous construct. The results indicate that the Q^2predict value exceeded the recommended threshold of 0.15 (Q^2 = 0.200), confirming the predictive capability of the model, as presented in Table 10: PLSpredict Results. The moderate Q^2predict value further suggests that the model possesses an acceptable level of predictive accuracy in explaining pro-sustainable behaviour.

Table 10. PLS Predict Results

	Q^2 predict	**RMSE**	**MAE**
PSB	0.200	0.398	0.707

Source: Authors' compilation

Note: Q2 > 0 indicates predictive relevance

Discussion

This paper is an attempt to empirically investigate how competencies developed through SL translate into PSB through the formulated behavioural theories. The findings of this study provide important theoretical insight into the long-standing knowledge–action gap within SL literature. The results claim that sustainability competencies do not have uniform behavioural influence and that competency development alone is insufficient to ensure behavioural transformation. Rather, the behavioural effectiveness of sustainability competencies appears to depend on the extent to which such competencies activate attitudinal, normative, moral, and control-related psychological processes. This supports the argument that sustainability competencies function as behaviourally latent capacities which require psychological and social activation mechanisms before they can be operationalised as PSB (Steg & De Groot, 2012; Colombo et al., 2023). Consequently, the study extends existing SL literature by demonstrating that the relationship between SL and behaviour is neither linear nor automatic, but behaviourally conditional.

Normative Thinking

Normative thinking, connecting attitude and subjective norms, demonstrated a positive relationship with PSB (β = 0.107, p = 0.003), highlighting the importance of ethical internalisation and social legitimisation in sustainability-oriented behaviour. This finding is both logical and theoretical in line with earlier research regarding the need to cultivate normative competency via learning disclosure and thus its significance in value-based reasoning and moral responsibility (Alberton et al., 2022). Such attributes are core principles in the accounting profession, where they operate in a highly financially sensitive context by professional conduct is strongly shaped by ethical responsibility, regulatory expectations, and stakeholder accountability, normative thinking may therefore become particularly behaviourally influential. As normative thinking, supported by positive attitudes developed through the influence of SL, becomes a prominent psychological construct that activates behavioural change (Ajzen, 1991). Further, the societal expectation that comes with this moral obligation implies that subjective norms act as a critical driver of both individual and collective behaviour' (Boström et al., 2018).

Strategic Thinking

Strategic thinking, when connected with perceived behavioural control and personal norms, demonstrated a positive relationship with PSB (β = 0.126, p = 0.001). This competency plays a critical role in strengthening individuals' capacity to translate sustainability intentions into action, while simultaneously nurturing a sense of responsibility toward collective sustainability goals (Redman & Wiek, 2021; Stern, 2000; Steg et al., 2005). Within the accounting profession, this competency becomes highly relevant due to the evolving role of accounting professionals as strategic decision makers specially towards strategic governance, sustainability assurance, and long-term value creation beyond their traditional reporting functions in an organisation (Accountancy Redefined | ACCA, 2025). This change aligns with the scope of the strategic competence developed through SL. The execution of sustainable actions further depends on confidence-building attributes, which enable individuals to operationalise sustainability strategies (Chan et al., 2022). In that context, the behavioural attributes connected with strategic thinking are salient. Perceived behavioural control builds confidence in individuals to believe that they can perform certain behaviours (Ajzen, 1991), and the personal norms internalise moral duty to act responsibly (Schwartz, 1977). The interaction of these attributes with strategic thinking energised the individuals to transform abstract sustainability goals into practical, achievable and accountable sustainable actions.

Interpersonal Thinking

Interpersonal thinking connected with personal norm and biospheric values, demonstrated a positive relationship with PSB (β = 0.095, p = 0.024). Interpersonal thinking, which is associated with communication, collaboration, empathy, and stakeholder engagement plays a key role in shaping an individual's perspectives and standards regarding sustainability, often motivating people to engage in eco-friendly practices and internalised moral responsibility (Steg, 2016; Ajibade & Boateng, 2021). Within the accounting profession, one of the key tasks is balancing profit-oriented objectives with sustainability considerations. In that context, interpersonal thinking plays key role in developing effective dialogue, negotiation and mutual understanding with stakeholders. However, to be convinced of such an opinion, it is important to have a certain degree of self-belief

and moral confidence about the sustainability concepts. Accordingly, the behavioural attributes connected with this competency strengthen these dialogues with its characteristics of ethical conviction and value alignment. Biospheric values, which exhibit intrinsic care for the environment and the welfare of non-human species (Steg et al., 2005), and personal norms, which develop internalised moral beliefs guiding responsible action, influence the adoption of effective norms within the group settings (Gamage et al., 2021). When concerns about environmental preservation are strengthened by moral belief, collaboration with communication, negotiation and empathy drives PSB effectively.

In contrast, the remaining two competencies, systems thinking and anticipatory thinking, did not demonstrate statistically significant effects, revealing that the individual and group attributes found in literature have not been adequately supported for PSB. One possible explanation for these results is that accounting professionals operate within organisational environments framed by regulatory constraints, performance pressures, institutional routines, and financially driven decision-making structures (Bebbington & Unerman, 2018). In such contexts, competencies related to systemic understanding and future-oriented thinking may not easily translate into practical behavioural action unless supported by stronger organisational incentives, leadership support, or institutional sustainability cultures. Accordingly, the findings imply that the behavioural operationalisation of systems and anticipatory thinking may depend on broader contextual and organisational mechanisms beyond the individual-level behavioural attributes examined in the present study. Accordingly, these findings indicate the need for further investigation to identify the specific individual and group behavioural attributes which support understanding complex systems, as reflected by systems thinking and futuristic decision making, as connected with anticipatory thinking, enabling accounting professionals to translate these two competencies into PSB. Given that these competencies are central to sustainability-related disclosures and forward-looking governance, it is particularly important to identify and develop the behavioural conditions that activate these competencies among accounting professionals.

Practical Implications

The findings of this study provide several important implications for professional accounting bodies, educators, and organisations. The results suggest that sustainability education and training programs should move beyond purely knowledge-oriented approaches and focus more explicitly on developing behaviourally oriented sustainability competencies. For professional accounting bodies, such as CA Sri Lanka, CMA Sri Lanka, ACCA, CIMA (UK) and similar institutions, there is a need to integrate behavioural elements into Continuous Professional Development (CPD) programs. This includes incorporating modules on ethical reasoning, stakeholder engagement, sustainability decision-making, and behavioural change mechanisms, rather than focusing solely on technical sustainability reporting standards.

From an organisational perspective, creating enabling environments that enhance perceived behavioural control and reinforce professional norms is critical. Organisations should provide accountants with greater autonomy, resources, and institutional support to implement sustainability-related decisions effectively.

For higher education institutions, the findings highlight the importance of designing curricula that not only build awareness but also facilitate behavioural transformation through experiential learning, case-based approaches, and real-world problem-solving related to sustainability challenges.

Conclusion

The primary aim of this study is to examine the competencies developed through SL and their nexus with PSB. The findings repeatedly confirm that the transformation of SL into PSB is not automatic. Rather, it depends on how individual competencies interact with individual- and group-level behavioural attributes. The results indicate that, among the five sustainability competencies, normative thinking, strategic thinking, and interpersonal thinking are more readily translated into behaviour when supported by attitudes, subjective norms, perceived behavioural control, personal norms, and biospheric values. In contrast, the remaining two competencies, systems thinking and anticipatory thinking, play a vital role in sustainability disclosure, it is necessary to find additional behavioural attributes to facilitate behavioural transformation.

This study contributes to theory by showing that sustainability competencies do not have the same behavioural effects, as commonly expected, all competencies are equally translated into pro-sustainable behaviour. The study combines the Key Competency Framework with existing theories about behaviour change such as the Theory of Planned Behaviour (TPB), Norm Activation Model (NAM) and Value-Belief-Norm (VBN) theory, and thus offers a comprehensive explanation of how SL is linked to action. Moreover, the results enrich the literature by offering empirical evidence in the context of a developing economy of how accounting practitioners' behaviour towards sustainability is influenced by their professional responsibilities, organisational structures and contextual constraints.

It is acknowledged that this study has several limitations. First, the findings are contextually specific to Sri Lanka, and therefore, it limits the generalisability to other geographical regions with diverse cultural, economic, and organisational settings. Moreover, the study used convenience and snowball sampling methods using professional networks, which might create self-selection bias and the representativeness of the sample may be limited because respondents with more sustainability interest or involvement in the profession were more likely to participate. Furthermore, the study was specifically focused on individual- and group-level behavioural attributes and organisational-level variables (leadership support in establishing a culture of sustainability) were not explicitly included in the study, as they may also impact the connection between sustainability competencies and behaviour. This will be lead for further study. Moreover, the current study used TPB, NAM, and VBN as the main behavioural frameworks, which may not fully capture other important behavioural dimensions such as habit formation (Verplanken & Wood, 2003), contextual and structural factors (Stern, 2000). Reworking with alternative or complementary theoretical perspectives may be important to explore new research avenues in sustainability behaviour. As per the past studies, interconnections among these competencies are varied and complex (Wiek et al., 2011; Redman & Wiek, 2021). Hence, there can be potential interdependence or connections

between the five key competencies, which may influence their connection with each other, which need to be empirically tested in future.

Addressing these limitations in future studies will strengthen the explanatory power of sustainability learning–behaviour models and enhance their potential contribution to national and international policy development, particularly in the field of sustainability education.

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