

Exploring Employees' Adoption of Sustainable Development Practices in Online Distance Learning Higher Education Institutions: Theory of Planned Behavior

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To Link this Article: <http://dx.doi.org/10.6007/IJAREMS/v12-i2/17521> DOI:10.6007/IJAREMS/v12-i2/17521

Published Online: 18 June 2023

Abstract

This study examines the implementation of sustainable development practices among employees in online distance-learning higher education institutions. It investigates the underlying principles of the Theory of Planned Behavior (TPB) and its application in comprehending the factors that impact sustainable behavior. The study assesses the direct and indirect correlations among variables of leadership styles, attitudes, subjective norms, perceived behavioral control, organizational commitment, intention, and the adoption of sustainable practices. The research sample comprises 392 individuals who participated by completing a survey questionnaire. Employing a causal-effect relationship design, the study employs Structural Equation Modeling (SEM) as the analytical technique. The results indicate that individual aspects, specifically attitudes and perceived behavioral control, significantly influence the intention to embrace sustainable practices. Additionally, the study emphasizes the influential role of organizational commitment and leadership styles in fostering sustainable behavior. It underscores the significance of cultivating a supportive social environment that reinforces sustainable norms and behaviors. The provision of resources,

support, and infrastructure emerges as a crucial factor in facilitating the adoption of sustainable practices. The study's implications underscore the importance of targeted interventions to cultivate positive attitudes, foster organizational commitment, and enhance perceived behavioral control. Future research opportunities may encompass longitudinal studies, comparative analyses, and cross-cultural examinations to achieve a comprehensive understanding of sustainable behavior adoption. In summary, this study advances current knowledge by shedding light on the determinants of sustainable practice adoption among employees in online distance learning institutions and offering practical recommendations for promoting sustainability in higher education contexts.

Keywords: Leadership Styles, Attitudes, Subjective Norms, Perceived Behavioral Control, Organizational Commitment, Intention, Adoption

Introduction

Higher education institutions worldwide are increasingly embracing sustainable development practices to address environmental, social, and economic challenges. They acknowledge their crucial role in shaping future leaders and driving societal change (Ziemba, 2019). These institutions are implementing various measures to promote sustainability on their campuses and beyond. They adopt renewable energy sources, and energy-efficient technologies, and strive for carbon neutrality to improve their infrastructure. Sustainable development is integrated into their curricula through interdisciplinary programs and courses focused on environmental conservation, social responsibility, and sustainable development (Noppers et al., 2019). Additionally, it emphasizes research on sustainable solutions, foster innovation, and collaborates with industries and communities to address real-world sustainability issues. Waste reduction, recycling, water conservation, sustainable transportation, awareness campaigns, student-led initiatives, and community engagement are also prioritized (Liu et al., 2019). By adopting sustainable practices, higher education institutions reduce their environmental impact and equip students with the necessary knowledge and skills for a sustainable future, serving as role models for other sectors and contributing to global sustainability efforts (Vardopoulos et al., 2019). The problem regarding the adoption of sustainable development practices by online distance learning higher education institutions in Malaysia focuses on comprehending the distinctive challenges and obstacles encountered when incorporating sustainability within the digital learning environment. The exponential growth of online education raises concerns regarding the environmental impact, resource utilization, and social accountability of these institutions. Examining the present state of sustainable development implementation in online distance learning settings facilitates the identification of gaps, constraints, and avenues for enhancement (Wang & Yang, 2020). The study aims to address the necessity for customized strategies, guidelines, and policies that foster sustainable practices specifically tailored to online education, guaranteeing that sustainability is not disregarded in the virtual learning landscape. The significance of adopting sustainable development practices extends beyond traditional higher education institutions in Malaysia (Balakrishnan et al., 2019). Online distance learning (ODL) institutions in the country have also acknowledged the importance of integrating sustainability into their operations (Osman et al., 2022). These ODL institutions have initiated and implemented diverse measures to promote sustainability, such as incorporating renewable energy sources, implementing waste reduction strategies, and integrating environmentally friendly practices into their online learning platforms (Alwi et al., 2021). This exemplifies the commitment of ODL institutions to minimize environmental impact and contribute to a sustainable future,

even within the digital education landscape (Osman et al., 2021). The adoption of sustainable development practices in online education showcases the adaptability and dedication of these institutions towards sustainable principles and demonstrates their role in shaping a more sustainable society. The study offers valuable insights into the unique challenges and opportunities they encounter in promoting sustainability within the digital learning environment. It enables the identification of effective strategies and best practices for seamlessly integrating sustainable development into online education platforms. The research findings also play a crucial role in informing policy decisions and resource allocation, providing support for sustainable practices within the online higher education sector. Ultimately, understanding the dynamics of sustainable development adoption in online distance learning institutions contributes to the overall progress of sustainability in higher education and facilitates the transition towards an educational landscape that is environmentally conscious and socially responsible. The purpose of this study is to assess the direct and indirect relationship among leadership style, attitude, subjective norms, perceived behavioral control, organizational commitment, intention, and adoption of sustainable development practices among employees of distance learning higher education institutions in Malaysia.

Literature Review

Underpinning Theory

The Theory of Planned Behavior (TPB) (Ajzen, 1991) offers a valuable theoretical framework for examining the adoption of sustainable development practices among employee-distance-learning higher education institutions. The TPB suggests that individual behavior is influenced by three key factors: attitudes, subjective norms, and perceived behavioral control. Attitudes involve individuals' positive or negative evaluations of specific behaviors, such as embracing sustainable practices. In the context of online distance learning institutions, comprehending employees' attitudes toward sustainability can help gauge their willingness to engage in sustainable behaviors. Subjective norms are shaped by social factors, including the perceived expectations and opinions of others. Exploring subjective norms within online distance learning institutions can provide insights into the impact of peers, colleagues, and organizational culture on employees' sustainability-related conduct. Perceived behavioral control reflects individuals' beliefs regarding their capability to successfully perform a behavior. In relation to sustainable practices, employees' perceived behavioral control can be influenced by factors like resource accessibility, training, and support. By applying the TPB to the investigation of sustainable development practices, researchers can assess employees' attitudes, subjective norms, and perceived behavioral control, thereby gaining a deeper understanding of the factors influencing their intention to adopt sustainable behaviors. Such understanding can inform the development of targeted interventions and strategies aimed at fostering sustainable practices among employees in online distance learning institutions, ultimately contributing to the realization of sustainability objectives.

Leadership Style, Intention & Adoption

Research has established the substantial impact of leadership styles on individuals' intention to adopt specific behaviors. Notably, transformational leadership has been positively associated with a higher inclination to adopt innovative practices (Magbity et al., 2020). Such leaders inspire their followers, stimulate creativity, and encourage thinking beyond

conventional norms, fostering positive intentions toward change. Conversely, transactional leadership exhibits a weaker association with the intention to adopt new behaviors compared to transformational leadership (Maaitah, 2018). Transactional leaders prioritize stability and compliance-based rewards, which may have limited effects on individuals' intentions to embrace change. The relationship between leadership style and adoption has garnered significant attention in the literature. Studies have indicated that transformational leadership significantly influences the adoption of innovative practices (Lee et al., 2019). These leaders create supportive environments, provide necessary resources, and act as role models, facilitating the adoption of new behaviors among their followers. Additionally, transactional leadership demonstrates a positive effect on adoption, particularly in contexts valuing compliance and clear expectations (Masood et al., 2020). Transactional leaders motivate individuals to adopt specific practices through rewards and recognition for desired behaviors. Intention emerges as a crucial mediator in the relationship between leadership style and adoption. Ratnasari and Lestari (2020) discovered that the positive association between transformational leadership and adoption was partially mediated by individuals' intentions to adopt innovative practices. This finding underscores the influential role of leaders in shaping followers' intentions, which subsequently drive the adoption of new behaviors.

Attitude & Intention

Attitudes exert a profound influence on students' intention formation across various educational behaviors. Positive attitudes toward attending classes, actively participating in learning activities, seeking academic support, and engaging in extracurricular activities are associated with higher intentions to engage in these behaviors. Similarly, students with positive attitudes toward their majors or specific courses demonstrate higher intentions to persist and achieve academic success. Moreover, attitudes toward online learning and educational technologies significantly shape students' intentions to participate in online courses and utilize technological resources. Attitudes within the higher education context are subject to various influencing factors, encompassing personal experiences, perceptions of the learning environment, and the perceived value of education. Students' attitudes toward learning and educational goals can be shaped by their prior experiences, such as academic achievements, social interactions, and cultural backgrounds (Boldureanu et al., 2020). Moreover, perceptions of the learning environment, including factors like teaching quality, support services, and campus culture, hold the potential to impact students' attitudes and subsequent intentions (Fearnley & Amora, 2020). Furthermore, the perceived value of education, including its significance for future career prospects and personal growth, also plays a role in shaping students' attitudes (Anees et al., 2021). Attitudes play a critical role in shaping students' intentions toward various educational behaviors. Positive attitudes toward attending classes, actively participating in learning, seeking academic support, and engaging in extracurricular activities have been found to be linked with higher intentions to engage in these behaviors (Jung et al., 2020). Similarly, students with positive attitudes toward their majors or specific courses are more likely to exhibit intentions to persist and achieve academic success (Park & Lin, 2020). Additionally, attitudes toward online learning and educational technology in higher education have been shown to influence students' intentions to participate in online courses and utilize technological tools (Osman, 2020).

Subjective Norms & Intention

Subjective norms are societal expectations that guide individuals' behaviors and shape their attitudes, decisions, and intentions (Sahin et al., 2021; Lin et al., 2021). They have a significant influence on individuals' intentions, either enhancing or deterring their engagement in specific behaviors (Sahin et al., 2021). Positive subjective norms, characterized by support and approval from others, can strengthen individuals' intention to adopt desired behaviors (Sahin et al., 2021). Conversely, negative subjective norms can discourage intentions aligned with certain behaviors (Lin et al., 2021). Subjective norms serve as reference points for appropriate conduct and exert social influence on beliefs, attitudes, and intentions (Boubker et al., 2021). Recognizing the impact of subjective norms on intention is crucial for developing interventions and strategies that foster positive behaviors and achieve desired outcomes (Boubker et al., 2021). According to Kim et al. (2021), the results of the study demonstrates that subjective norms significantly impact students' intentions to accept and utilize online learning systems. These subjective norms encompass the perceived expectations and behaviors of peers, instructors, and the broader social network. Positive subjective norms, characterized by endorsement and positive experiences shared by others, have a positive influence on students' intentions to adopt and engage with online learning platforms. The study also highlights the moderating role of user innovativeness, which refers to individuals' openness to trying new technologies and embracing innovation. It is found that highly innovative students are more susceptible to the influence of positive subjective norms, resulting in a higher intention to accept and utilize online learning systems. According to Aliedan et al (2022), the study highlights the significant impact of subjective norms on students' entrepreneurship orientation and intention. The perceived beliefs and behaviors of peers, family, and society regarding entrepreneurship play a crucial role in shaping students' attitudes and intentions. Positive subjective norms, characterized by support and encouragement from others, contribute to a favorable attitude towards entrepreneurship and enhance the intention to engage in entrepreneurial activities. The findings emphasize the influence of subjective norms in fostering an entrepreneurial mindset and promoting entrepreneurial intentions among students.

Perceived Behavioral Control, Intention & Adoption

Perceived behavioral control refers to an individual's belief in their capability to successfully carry out a specific behavior. It encompasses factors like self-efficacy, perceived resources, and external limitations. This belief strongly influences intentions and the likelihood of engaging in the behavior. In the study by Dalila et al (2020), personal values are explored as a mediator in the relationships between attitudes, subjective norms, perceived behavioral control, and intention to use. The research reveals that personal values play a significant mediating role, as attitudes, subjective norms, and perceived behavioral control indirectly affect intention through the influence of personal values. Kimuli et al (2020) emphasize the role of sustainability intention as a mediator between sustainability behavioral control and sustainable entrepreneurship. The study examines how sustainability behavioral control influences individuals' intention to engage in sustainable entrepreneurial activities. The findings highlight that sustainability intention plays a crucial mediating role, linking sustainability behavioral control and sustainable entrepreneurship. This suggests that individuals' perception of their control over sustainable behaviors influences their intention to pursue sustainable entrepreneurship, emphasizing the significance of fostering sustainable intentions and behavioral control for promoting sustainable entrepreneurial practices. Cop et

al (2020) investigated the relationship between hotels' green training, environmental commitment, organizational citizenship behavior, and the mediating role of perceived behavioral control. The study reveals that perceived behavioral control acts as a mediator between green training, environmental commitment, and organizational citizenship behavior in the hotel industry. The findings emphasize the importance of providing green training to enhance employees' perceived control, which subsequently influences their commitment to environmental practices and fosters organizational citizenship behavior for sustainability. Kimuli et al (2020) investigate the relationship between perceived behavioral control and adoption in the context of sustainable entrepreneurship. The study suggests that perceived behavioral control significantly influences individuals' adoption of sustainable entrepreneurial practices. The findings indicate that individuals who perceive a greater sense of control over sustainable behaviors are more likely to adopt and engage in sustainable entrepreneurship. This highlights the crucial role of perceived behavioral control in driving the adoption of sustainable practices in entrepreneurial ventures. This is supported by Eanes and Zhou (2020) who examine the relationship between perceived behavioral control and the adoption of stormwater best management practices (BMPs) in urban and suburban residential areas. The study reveals that perceived behavioral control is a key factor influencing the adoption of these practices. Individuals who perceive a higher level of control over implementing stormwater BMPs are more inclined to adopt them. This underscores the significance of perceived behavioral control in driving the adoption of environmentally sustainable practices in residential settings.

Organizational Commitment, Intention & Adoption

Organizational commitment can be defined as the degree of employees' dedication and emotional connection to their organization. It encompasses loyalty, identification, and active engagement with the organization's objectives and values. Employees who possess high organizational commitment are inclined to remain with the organization, experience higher job satisfaction, and voluntarily contribute efforts to accomplish organizational goals. Several factors influence organizational commitment, including perceived support from the organization, job satisfaction, organizational culture, and growth opportunities. This commitment significantly impacts employee retention, performance, and the overall success of the organization (Osman et al., 2019). Hutagalung et al (2020) find that higher organizational commitment increases the intention to stay, influenced by work-life balance. Promoting organizational commitment enhances retention. Purwanto (2020) shows higher organizational commitment reduces turnover intentions, with work satisfaction mediating. Organizational commitment and work satisfaction are crucial for reducing turnover intentions and enhancing employee stability (Hutagalung et al., 2020; Purwanto, 2020). Rawashdeh and Tamimi (2020) examine how nurses' perceptions of training, organizational commitment, and turnover intention are interconnected in Jordanian hospitals. The study finds that nurses who hold positive perceptions of training programs demonstrate higher levels of organizational commitment. Moreover, higher organizational commitment is connected to lower turnover intentions among nurses. These findings indicate that well-designed and effective training programs have the potential to enhance organizational commitment, subsequently decreasing turnover intentions among nurses working in Jordanian hospitals. In their study, Hussain et al (2020) investigate how organizational commitment influences turnover intention in the academic sector. The research demonstrates that academic professionals who exhibit a stronger commitment to their organization are less likely to have intentions of

leaving. This highlights the significance of fostering organizational commitment as a means to decrease turnover intentions within the academic sector. In their study, Naruetharadhol et al (2021) investigate the correlation between organizational commitment and the adoption of green innovation in Thailand's heavy industry. The research explores how the integration of green innovation practices into the organizational structure impacts employees' commitment to the organization. The findings reveal that employees exhibit higher levels of organizational commitment when they perceive the organization as actively embracing green innovation. This indicates that incorporating green initiatives into the organizational structure can promote greater organizational commitment among employees in Thailand's heavy industry sector. The relationship between organizational commitment and adoption pertains to the link between an individual's dedication to an organization and their inclination to embrace new practices or changes within that organization. Organizational commitment refers to employees' identification and devotion to their organization, while adoption refers to the acceptance and implementation of novel ideas, technologies, or processes (Cheng & Osman, 2021). Research indicates that higher levels of organizational commitment are associated with a greater likelihood of adopting new practices within the organization. A strong sense of commitment motivates employees to actively engage in and support the adoption process, encompassing the acceptance of innovative strategies, technologies, or initiatives (Osman et al., 2022). Conversely, low levels of organizational commitment can impede the adoption process, as less committed employees may resist or hesitate to embrace new practices, hindering organizational change efforts (Alwi et al., 2022).

Based on the above hypotheses' development, the following research hypotheses were developed for this study

- H1:* There is a relationship between attitude (ATT) and intention (INT) in the adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H2:* There is a relationship between leadership style (LS) and intention (INT) in the adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H3:* There is a relationship between organizational commitment (OC) and intention (INT) in the adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H4:* There is a relationship between perceived behavioral control (PBC) and intention (INT) in the adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H5:* There is a relationship between subjective norms (SN) and intention (INT) in the adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H6:* There is a relationship between intention (INT) and adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H7:* There is a relationship between leadership style (LS) and adoption (ADP) in the adoption of sustainable development practices among ODL higher education institutions.
- H8:* There is a relationship between organizational commitment (OC) and adoption (ADP) in the adoption of sustainable development practices among ODL higher education institutions.

- H9: There is a relationship between perceived behavioral control (PBC) and adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H10: There is a mediating effect of intention (INT) on the relationship between leadership style (LS) and adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H11: There is a mediating effect of intention (INT) on the relationship between organizational commitment (OC) and adoption (ADP) of sustainable development practices among ODL higher education institutions.
- H12: There is a mediating effect of intention (INT) on the relationship between perceived behavioral control (PBC) and adoption (ADP) of sustainable development practices among ODL higher education institutions.

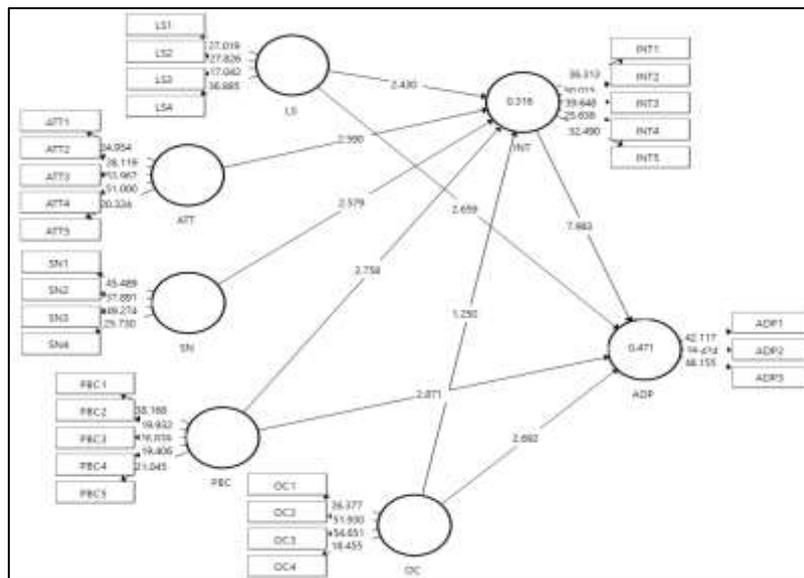


Figure 1: Specified Model

Note: LS=Leadership Style ATT=Attitude SN=Subjective Norms PBC=Perceived Behavioral Control OC=Organizational Commitment INT=Intention ADP=Adoption

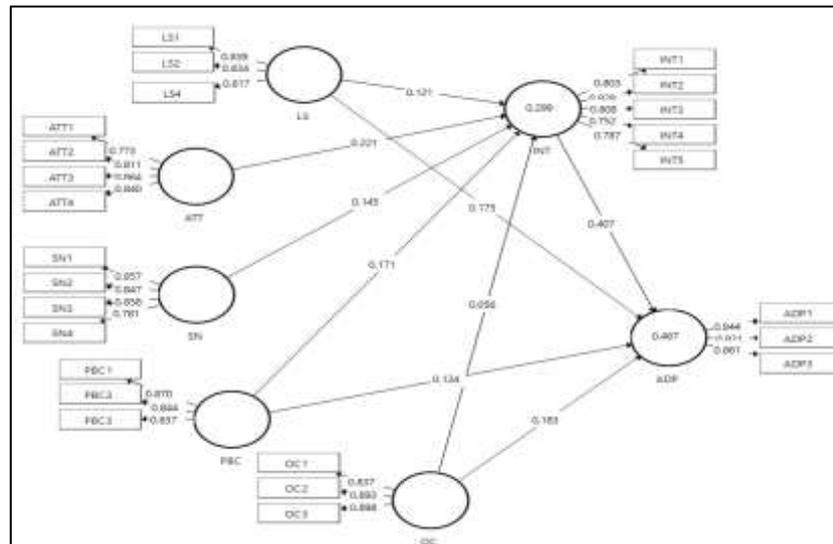


Figure 2: Re-specified Model

Methodology

This study focused on employees working in online distance-learning higher education institutions. Primary data was collected using survey equipment, and the survey questionnaire utilized in the study was carefully developed based on previous research, ensuring reliability and validity. A non-probabilistic snowball sampling technique was employed, with participants receiving the survey questionnaire via email. The survey consisted of 30 observed variables, including exogenous and endogenous measurements. The endogenous variables encompassed constructs such as leadership styles, attitude, subjective norms, perceived behavioral control, and organizational commitment, with measurement items adapted from established studies. The mediating variable was intention, while the dependent variable was adoption, both assessed using specific measurement items. Participants rated each measurement item on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." Out of the 495 questionnaires distributed, 413 were collected, resulting in a response rate of 75.6%. After screening the data and removing outliers, 392 questionnaires remained for analysis. Table 1 provided an overview of the profile of the online distance-learning student respondents included in the sample. For data analysis and hypothesis testing, Smartpls4 software was employed, utilizing structural equation modeling (SEM) techniques. This choice was made due to the software's evaluation capabilities and its suitability for multivariate data analysis. Additionally, model measurement and structural model evaluation procedures followed the guidelines proposed by Ringle et al (2022), with Smartpls4 facilitating these assessments. The use of Smartpls4 enabled researchers to conduct comprehensive multivariate data analysis and test the proposed hypotheses effectively. The software's capabilities allow for a thorough evaluation of the measurement and structural models, aligning with the objectives of the study.

Data Analysis

Respondents Profiles

The survey respondents consisted of 392 individuals, with 45.7% identifying as male and 54.3% as female. This near-even split between genders suggests a relatively balanced representation within the sample. The age distribution reveals interesting patterns. The largest group is 41-50 years old, comprising 45.2% of the respondents. This could indicate that

individuals within this age range were more inclined to participate in the survey. The 31-40 years old group follows closely, representing 28.1% of the respondents. Meanwhile, the younger age groups (<30 years old) and the older age groups (>60 years old) have smaller representations at 8.4% and 5.6%, respectively. This age distribution provides insights into the generational composition of the sample population. The majority of respondents, accounting for 77.8%, belong to the academic job category, while the remaining 22.2% are classified as non-academic. This difference suggests that the survey targeted a predominantly academic population. Understanding this composition is crucial for interpreting the subsequent findings in relation to the job-related variables. The distribution of years of service among the respondents provides valuable information about their experience levels. The highest proportion (39.5%) falls within the 11-15 years range, indicating a significant representation of individuals with moderate experience. Notably, the percentage of respondents decreases as the years of service decrease or increase from this range, suggesting a relatively stable workforce in terms of tenure. The final variable in the table pertains to the respondents' recommendation response. An overwhelming majority of 88.3% indicated a positive recommendation, while 11.7% responded negatively.

Common Method Bias

Kock (2015); Kock & Lynn (2012) proposed a comprehensive method called the collinearity test for evaluating vertical and horizontal collinearity. Pathological collinearity is indicated by variance inflation factors (VIFs) exceeding 3.3, highlighting a common method bias problem in the model. Therefore, if the VIFs from the total collinearity check were below 3.3, it is assumed that the model does not suffer from common method bias. In Table 2, the VIFs from the total collinearity check were below 3.3, confirming the absence of any common method bias issue.

Table 1

Full Collinearity Statistics (VIF)

Constructs	MLS	MATT	MSN	MPBC	MOC	MINT	MADP
MLS		1.536	1.721	1.749	1.746	1.736	1.744
MATT	2.099		2.393	2.193	2.329	2.381	2.36
MSN	1.385	1.409		1.405	1.388	1.406	1.362
MPBC	2.596	2.381	2.592		2.039	2.578	2.579
MOC	2.344	2.287	2.316	1.948		2.350	2.327
MINT	1.667	1.672	1.678	1.668	1.944		1.445
MADP	1.954	1.935	1.897	1.844	1.681	1.687	

Reflective Model Measurement

This study adopted the technique of evaluating each of the measurements in the first order and second order as suggested by (Hair et al., 2017). This technique will allow identifying items with low loading below the threshold of 0.7. First, the specified model was introduced (Figure 1) and the construct reliability and validity result has shown that some items demonstrated a loading less than 0.7 and caused Average Variance Extracted (AVE) of leadership style and perceived behavioral control less than the threshold of 0.5. After the deletion of some problematic items which were less than 0.7, the re-specified model was introduced (Figure 2) and the construct reliability & validity showed the AVE of all constructs were greater than 0.5 (Table 2) ranging from 0.635 to 0.723 (Table 2) signifying the

establishment of convergent validity (Hair et al., 2017). The composite reliability for all constructs was also greater than 0.7 ranging from 0.880 to 0.903. Further, all constructs Cronbach alpha was greater than 0.7, ranging from 0.775 to 0.857 (Table 2). In order to establish discriminant validity, the initial step involved evaluating cross-loadings to ensure that all items appropriately represented and measured their respective constructs (Table 2). Subsequently, discriminant validity was further assessed using the Heterotrait-Monotrait (HTMT) ratio. The HTMT technique is a recommended criterion for examining discriminant validity in Variance-Based Structural Equation Modeling (VB-SEM) (Henseler et al., 2015). Table 3 presented the HTMT ratios for the constructs, along with the original sample and 95% confidence intervals (two-tailed), indicating compliance with discriminant validity based on the HTMT threshold of 0.85, and the bias-corrected and accelerated bootstrap confidence intervals were found to be below 1, indicating that the upper limit of the intervals remained within a favorable range. This analysis reinforced the confidence in the distinctiveness of the constructs and their ability to measure different aspects of the phenomenon under investigation.

Table 2

Construct Reliability, Validity & Cross Loadings

Constructs	Items	Loadings	CA	CR	AVE
Adoption	ADP1	0.844	0.795	0.880	0.709
	ADP2	0.821			
	ADP3	0.861			
Attitude	ATT1	0.773	0.842	0.893	0.677
	ATT2	0.811			
	ATT3	0.864			
	ATT4	0.840			
Intention	INT1	0.803	0.856	0.896	0.634
	INT2	0.828			
	INT3	0.808			
	INT4	0.752			
	INT5	0.787			
Leadership Style	LS1	0.839	0.775	0.869	0.689
	LS2	0.834			
	LS4	0.817			
Organizational Commitment	OC1	0.837	0.850	0.909	0.768
	OC2	0.893			
	OC3	0.898			
Perceived Behavioral Control	PBC1	0.870	0.809	0.887	0.723
	PBC2	0.844			
	PBC3	0.837			
Subjective Norms	SN1	0.857	0.857	0.903	0.700
	SN2	0.847			
	SN3	0.858			
	SN4	0.781			

Table 3

Heterotrait-Monotrait (HTMT) Ratios

	Ratios	2.50%	97.50%
ATT -> ADP	0.655	0.566	0.737

INT -> ADP	0.718	0.636	0.792
INT -> ATT	0.553	0.450	0.654
LS -> ADP	0.570	0.451	0.682
LS -> ATT	0.680	0.589	0.763
LS -> INT	0.462	0.350	0.571
OC -> ADP	0.585	0.477	0.687
OC -> ATT	0.681	0.588	0.766
OC -> INT	0.454	0.338	0.561
OC -> LS	0.525	0.404	0.638
PBC -> ADP	0.558	0.459	0.653
PBC -> ATT	0.687	0.600	0.769
PBC -> INT	0.500	0.392	0.601
PBC -> LS	0.404	0.292	0.512
PBC -> OC	0.657	0.560	0.747
SN -> ADP	0.551	0.443	0.651
SN -> ATT	0.483	0.359	0.599
SN -> INT	0.426	0.307	0.535
SN -> LS	0.477	0.344	0.601
SN -> OC	0.482	0.372	0.585
SN -> PBC	0.423	0.298	0.538

Note: CI 95% LS=Leadership Style ATT=Attitude SN=Subjective Norms
PBC=Perceived Behavioral Control OC=Organizational Commitment
INT=Intention ADP=Adoption

Structural Model

The structural model evaluation in this study involved the simultaneous assessment of pathway coefficients (β) and coefficients of determination (R^2), following the methodology outlined by (Hair et al., 2017). The Partial Least Squares (PLS) method was employed, utilizing 5000 subsamples to determine the significance level of path coefficients. The results of hypothesis tests for confidence intervals, including the path coefficients (beta), corresponding t-statistics, and p-values, are presented in Table 3. This comprehensive analysis provides insights into the significance and strength of the relationships among the variables in the structural model. For hypothesis 1, the analysis reveals that there is a significant positive relationship between attitude and intention. The beta coefficient was $\beta=0.221$, t-statistic=3.609, and p-value=0.000. Therefore, Hypothesis H1 is supported. For Hypothesis 2, the analysis reveals a significant positive relationship between leadership style and intention. The beta coefficient was $\beta = 0.121$, t-statistic=2.237, and p-value=0.025. Therefore, Hypothesis H2 is supported. For Hypothesis 3, the analysis does not reveal a significant relationship between organizational commitment and intention. The beta coefficient was $\beta = 0.056$, t-statistics=0.965, and p-value=0.335. Consequently, Hypothesis H3 is not supported. For Hypothesis 4, the analysis demonstrates a significant positive relationship between perceived behavioral control and intention. The beta coefficient was $\beta=0.171$, t-statistics=3.093, and p-value=0.002. Thus, Hypothesis H4 is supported. For Hypothesis 5, the analysis reveals a significant positive relationship between subjective norms and intention. The beta coefficient was $\beta=0.145$, t-statistics=2.896, and p-value=0.004. Therefore, Hypothesis H5 is supported. For Hypothesis 6, the analysis shows a significant positive relationship between intention and adoption. The beta coefficient was $\beta=0.407$, t-

statistics=8.698, and p-value=0.000. Thus, Hypothesis H6 is supported. For Hypothesis 7, the analysis demonstrates a significant positive relationship between leadership style and adoption. The beta coefficient was $\beta=0.175$, t-statistics= .460, and p-value=0.001. Hence, Hypothesis H7 is supported. For Hypothesis 8, the analysis indicates a significant positive relationship between organizational commitment and adoption. The beta coefficient was $\beta=0.183$, t-statistics=3.127, and p-value=0.002. Therefore, Hypothesis H8 is supported. For Hypothesis 9, the analysis reveals a significant positive relationship between perceived behavioral control and adoption. The beta coefficient was $\beta=0.124$, t-statistics=2.560, and p-value=0.010. Hence, Hypothesis H9 is supported. Statistical analysis of hypothesis 10 revealed that intention mediated the relationship between Leadership style and adoption with the indirect beta coefficient $\beta=0.049$, t-statistics=2.130, and the p-value=0.033. Therefore, Hypothesis H10 is supported, suggesting that leadership style has an indirect influence on adoption through intention as a mediator. Statistical analysis of Hypothesis 11 did not reveal a significant relationship between Organizational commitment and Intention with a beta coefficient of $\beta=0.023$, t-statistic=0.952, and p-value=0.341. Consequently, Hypothesis H11 is not supported, indicating that there is no evidence to conclude that organizational commitment has an indirect influence on adoption through intention as a mediator. For Hypothesis 12, the statistical analysis demonstrated that intention mediated the relationship between perceived behavioral control and adoption, with an indirect beta coefficient of $\beta=0.070$, t-statistics=3.070, and p-value=0.002. Thus, Hypothesis H12 is supported, suggesting that perceived behavioral control has an indirect influence on adoption through intention as a mediator.

The analysis conducted in the study provided substantial evidence to support the majority of the hypotheses, confirming the relationships among the variables under investigation. A summary of the hypothesis testing results is presented in Table 4, including the effect size, which measures the magnitude of an effect independently of the sample size. Effect sizes in this study were assessed using Cohen's criteria (1992) and categorized as small (0.020 to 0.150), medium (0.150 to 0.350), or large (0.350 or greater). The observed effect sizes ranged from small (0.003) to large (0.231). The intrinsic value inflation factor (VIF) values, displayed in Table 5, were all below the more lenient threshold of 5, with the highest value being 2.161. This level of collinearity allows for meaningful comparisons of sizes and interpretation of coefficients in the structural model. The revealed a significant degree of explained variance for the endogenous construct, with an R^2 value of 0.467 (Figure 2). Regarding the mediator, the model accounted for approximately 29.9% of the variance in the structure, indicated by an R^2 value of 0.299. The model's ability to make inferences and provide management suggestions was evaluated through out-of-sample predictive analysis using the PLSpredict method, as described by Shmueli et al (2016, 2019). In Table 6, Q2 predictions higher than 0 indicated that the predictions made by PLS-SEM outperformed the standard naive mean prediction results. Additionally, the root mean square error (RMSE) values of the PLS-SEM predictions were lower than those of the linear model (LM) prediction benchmark in seven out of eight instances, indicating the predictive power of the proposed model (Table 6).

Hair et al (2022) proposed the inclusion of the Cross-Validated Predictive Ability Test (CVPAT) in the assessment of PLS-SEM results to evaluate the model's predictive capabilities. To evaluate the model's predictive performance, Lingard et al (2021) conducted a CVPAT alongside the PLSpredicts analysis. The CVPAT employed an out-of-sample prediction method

to measure the model's prediction error and calculate the average loss value. Two benchmarks were used to compare the average loss value: the average loss value of predictions using indicator averages (IA) as a simple benchmark and the average loss value of a linear model (LM) forecast as a more conservative benchmark. To establish the superior predictive capabilities of the model compared to the benchmarks, the average loss value of PLS-SEM should be lower, resulting in a negative difference in the average loss values. The CVPAT aimed to assess whether the difference in average loss values between PLS-SEM and the benchmarks was significantly below zero. A significantly negative difference would indicate the model's enhanced predictive abilities. The results of the CVPAT, presented in Table 7, confirm that the average loss value of PLS-SEM was indeed lower than that of the benchmarks. This is evident from the negative difference in the average loss values, providing evidence of the model's superior predictive capabilities.

Ringle and Sarstedt (2016); Hair et al (2018) suggested using Importance Performance Analysis (IPMA) to assess the significance and effectiveness of latent variables in explaining acceptance. The findings of this analysis can be found in Table 8. In terms of overall impact, the strongest influence on adoption was observed for intention (0.407), followed by leadership style (0.224), organizational commitment (0.206), perceived behavioral control (0.194), attitude (0.090), and subjective norms (0.059). These values indicate the relative importance of each latent variable in the adoption context. In terms of performance scores, perceived behavioral control achieved the highest score (69.291), while intention had the lowest score (61.036) on a scale ranging from 0 to 100. This suggests that perceived behavioral control performed relatively well, while intention had the lowest level of achievement. Despite being the most crucial factor for adoption, intention demonstrated the lowest performance level. Based on these findings, it is recommended that top management in ODL higher education institutions prioritize and emphasize activities that aim to improve employees' intention. By focusing on enhancing intention, it is possible to enhance overall performance.

Table 4
Hypotheses Testing Results & f^2

Hypotheses	Beta	T Statistics	P Values	f^2	2.50%	97.50%	Decisions
H1: ATT -> INT	0.221	3.609	0.000	0.033	0.098	0.336	<i>Supported</i>
H2: LS -> INT	0.121	2.237	0.025	0.013	0.009	0.223	<i>Supported</i>
H3: OC -> INT	0.056	0.965	0.335	0.003	-0.057	0.169	<i>Not Supported</i>
H4: PBC -> INT	0.171	3.093	0.002	0.025	0.062	0.276	<i>Supported</i>
H5: SN -> INT	0.145	2.896	0.004	0.023	0.046	0.241	<i>Supported</i>
H6: INT -> ADP	0.407	8.698	0.000	0.231	0.312	0.494	<i>Supported</i>
H7: LS -> ADP	0.175	3.460	0.001	0.044	0.076	0.274	<i>Supported</i>
H8: OC -> ADP	0.183	3.127	0.002	0.039	0.067	0.292	<i>Supported</i>
H9: PBC -> ADP	0.124	2.560	0.010	0.019	0.029	0.216	<i>Supported</i>
H10: LS -> INT -> ADP	0.049	2.130	0.033		0.004	0.095	<i>Supported</i>
H11: OC -> INT -> ADP	0.023	0.952	0.341		-0.023	0.071	<i>Not Supported</i>
H12: PBC -> INT -> ADP	0.070	3.070	0.002		0.028	0.116	<i>Supported</i>

Table 5

Collinearity Statistics – Inner VIF

	ADP	INT
ATT		2.129
INT	1.344	
LS	1.322	1.56
OC	1.635	1.785
PBC	1.552	1.695
SN		1.332

Table 6

PLSpredict

	PLS RMSE	LM RMSE	PLS-LM	Q ² _predict
ADP1	0.633	0.621	0.012	0.300
ADP2	0.622	0.628	-0.006	0.231
ADP3	0.678	0.695	-0.017	0.235
INT1	0.620	0.627	-0.007	0.219
INT2	0.629	0.649	-0.020	0.180
INT3	0.680	0.685	-0.005	0.138
INT4	0.684	0.701	-0.017	0.148
INT5	0.622	0.634	-0.012	0.176

Table 7

Cross-Validated Predictive Ability test (CVPAT)

	Average loss difference	t value	p-value
ADP	-0.142	6.092	0
INT	-0.087	4.679	0
Overall	-0.108	6.333	0

Table 8

Importance-Performance Map Analysis (IPMA)

	Total Effect	Performance
ATT	0.090	67.315
INT	0.407	61.036
LS	0.224	66.968
OC	0.206	62.514
PBC	0.194	69.291
SN	0.059	67.155

Discussion & Conclusion

The aim of this study is to assess the direct and indirect relationships among leadership style, attitude, subjective norms, perceived behavioral control, organizational commitment, intention, and the adoption of sustainable development practices in online distance learning higher education institutions. Based on the statistical analysis results, it is crucial for these institutions to develop strategies that enhance the adoption of sustainable development practices. To accomplish this, online distance learning institutions should focus on cultivating positive attitudes toward sustainable development among employees. This can be

accomplished through educational initiatives like integrating sustainability-focused content into the curriculum, emphasizing the benefits and significance of sustainable practices, and organizing awareness campaigns. Additionally, it is important for these institutions to promote leadership styles that prioritize sustainability in order to strengthen employees' intentions toward sustainable development. This entails encouraging administrators, faculty, and staff to exemplify and endorse sustainable behaviors, integrating sustainability principles into institutional policies and decision-making processes, and acting as role models. Establishing a commitment within the organization toward sustainable development is of utmost importance. Institutions should cultivate a collective sense of responsibility and engagement among their faculty, staff, and employees. This can be accomplished by creating avenues for participation in sustainability initiatives, setting up sustainability committees or task forces, and acknowledging and rewarding sustainable actions taken within the institution. It is crucial to empower employees to adopt sustainable practices by enhancing their perceived behavioral control. Online distance learning institutions should provide the necessary resources, guidance, and support to enable employees to embrace sustainability. This may involve offering workshops that focus on sustainability, providing access to relevant information and tools, and facilitating platforms for collaboration and knowledge-sharing, allowing employees to exchange ideas and experiences related to sustainability. Creating a supportive social environment that fosters sustainable norms and behaviors is vital. Institutions should foster a sense of community and belonging where sustainable practices are encouraged and celebrated. This can be achieved through the organization of sustainability-themed events, the promotion of employee-led sustainability initiatives and clubs, and the facilitation of discussions and forums on sustainability topics. Considering that intention significantly influences the adoption of sustainable development practices, institutions should prioritize activities that reinforce employees' intentions. This could entail integrating sustainability-related projects and assignments into work responsibilities, providing opportunities for the practical application of sustainable practices, and offering mentorship or guidance to support employees in implementing sustainable behaviors. In order to promote the adoption of sustainable practices, it is crucial for online distance learning institutions to ensure that sustainability is deeply ingrained in their leadership practices. This can be accomplished by incorporating sustainability objectives into strategic plans, allocating resources for sustainability initiatives, and establishing mechanisms to monitor and evaluate the institution's progress in achieving sustainability goals. To encourage the adoption of sustainable practices, institutions should foster a culture of organizational commitment to sustainability. This entails involving faculty, staff, and employees in projects related to sustainability, creating opportunities for interdisciplinary collaborations on sustainability matters, and integrating sustainability considerations into operational practices and decision-making processes. In order to facilitate the adoption of sustainable practices, institutions should provide support to employees by offering the necessary resources and infrastructure. This could involve providing sustainable facilities and infrastructure, promoting environmentally friendly practices in administrative operations, and offering financial incentives or grants for initiatives focused on sustainability. These hypotheses suggest that the combination of leadership styles, organizational commitment, and perceived behavioral control influences both intention and the adoption of sustainable practices. Therefore, institutions should take a comprehensive approach by integrating these factors holistically into their strategies. This may include developing comprehensive sustainability plans, fostering collaboration among different departments and stakeholders, and aligning

policies and practices to create a conducive environment for the adoption of sustainable practices.

Theoretical Implications

The study investigating the adoption of sustainable development practices among employees in online distance learning higher education institutions has important theoretical implications that contribute to the existing knowledge on sustainability and organizational behavior. It underscores the significance of individual factors, such as attitudes, perceived behavioral control, and intention, in driving the adoption of sustainable practices. These findings align with theories like the Theory of Planned Behavior, which posit that individual beliefs, motivations, and perceptions significantly influence the adoption of new behaviors. By exploring the relationships among these factors, the study provides theoretical support for the impact of individual-level variables on sustainable behavior. Moreover, the study highlights the role of organizational commitment and leadership styles in promoting sustainable practices. Organizational commitment theory suggests that employees who exhibit dedication to their organization are more likely to engage in behaviors that align with the organization's goals and values. By examining the connections between organizational commitment, leadership styles, and the adoption of sustainable practices, the study enhances our understanding of how organizational factors shape employees' engagement in sustainability-related behaviors. Additionally, the study investigates the influence of subjective norms on the adoption of sustainable practices. Subjective norms theory posits that an individual's behavior is influenced by the perceived expectations and behaviors of others in their social environment. By analyzing the impact of subjective norms on sustainable behavior, the study provides insights into the role of social influence and normative pressures in shaping employees' decisions to adopt sustainable practices. Lastly, the study emphasizes the importance of providing resources, support, and infrastructure to facilitate the adoption of sustainable practices. This aligns with theories such as the Social-Ecological Model, which emphasizes the significance of the physical and social environment in enabling behavior change. The study offers theoretical insights into the factors that enhance employees' capacity to engage in sustainable practices by examining the role of resources and support within online distance learning institutions.

Practical Implications

The study underscores the significance of addressing individual-level factors, such as attitudes, perceived behavioral control, and intention, to drive the adoption of sustainable practices. Institutions have the opportunity to develop focused interventions aimed at cultivating positive attitudes toward sustainability. They can provide training and guidance to enhance employees' sense of control over their sustainable behaviors and implement initiatives that reinforce employees' intention to engage in sustainable practices. Furthermore, the study emphasizes the importance of organizational commitment and leadership styles in promoting sustainability. Institutions can foster a culture of organizational commitment by integrating sustainability goals into their strategic plans. They can create platforms for employees to actively participate in sustainability initiatives, enabling them to contribute to and feel ownership of sustainability efforts. Additionally, institutions can cultivate leadership styles that prioritize sustainability. By encouraging administrators and managers to lead by example and incorporating sustainability principles into decision-making processes, institutions can demonstrate a strong commitment to sustainability throughout

the organization. The study also highlights the role of subjective norms in influencing sustainable practices. Institutions can foster a supportive social environment by organizing events centered around sustainability, promoting employee-led sustainability initiatives, and facilitating open discussions on sustainability topics. These actions contribute to the establishment of sustainable norms within the institution and encourage collective engagement toward sustainable behaviors. Lastly, the study underscores the importance of providing resources, support, and infrastructure to facilitate the adoption of sustainable practices. Institutions can invest in sustainable infrastructure and facilities, providing employees with the necessary tools and information to engage in sustainable behaviors. They can also offer financial incentives or grants specifically allocated for sustainability-focused initiatives, removing potential barriers and empowering employees to embrace and sustain sustainable practices.

Suggestions for Future Study

Future research in the realm of adopting sustainable development practices among employees in online distance learning higher education institutions can target various avenues. Long-term investigations can provide valuable insights into the progression of sustainable behavior over time, whereas comparative analyses can delve into the distinct challenges and prospects inherent in the online learning environment. Cross-cultural examinations can shed light on the impact of cultural elements on sustainable behavior, and employing mixed-methods approaches can yield a comprehensive understanding of the underlying factors. Intervention studies can evaluate the effectiveness of specific strategies and interventions while incorporating multiple stakeholder perspectives can offer a holistic comprehension of the hurdles and opportunities in implementation. By addressing these areas, researchers can augment the existing knowledge and furnish actionable recommendations for fostering sustainable practices in online distance learning institutions, thereby fostering a greener and more sustainable future.

Conclusion

The results of this study support several hypotheses. Specifically, H1 (ATT → INT), H2 (LS → INT), H4 (PBC → INT), H5 (SN → INT), H6 (INT → ADP), H7 (LS → ADP), H8 (OC → ADP), H9 (PBC → ADP) and H10 (LS → INT → ADP) are supported. These findings suggest that attitudes, behaviors, behavioral control, and social norms play an important role in shaping people's intentions to participate with specific attributes. Additionally, emotions have been shown to influence decision-making behavior. H3 (OC → INT) and H11 (OC → INT → ADP) were not supported in this study. This suggests that organizational commitment may not directly affect personal goals or decision-making behavior, but other factors such as attitudes and may be influential. The importance of this study is that it contributes to existing theoretical knowledge about the relationship between various factors and emotions and the influence of emotions on decision-making behavior. By providing empirical evidence for these theories, this research validates the importance of attitudes, perceived behavioral control, and subjective norms in creating personal emotions and subsequent behavior. In addition, the historical background of this research is also important. The findings improve our understanding of the situation by examining these relationships in a specific context. The contribution of research on this topic can provide a better understanding of the factors that influence individual intentions and decision-making behavior in specific controlling contexts. Future research in the field of sustainable development practices among employees in online

distance learning higher education institutions can explore various avenues. Longitudinal studies can provide valuable insights into the progression of sustainable behavior over time, while comparative analyses can examine the unique challenges and opportunities specific to the online learning context. Cross-cultural investigations can illuminate the influence of cultural factors on sustainable behavior, and adopting mixed-methods approaches can provide a comprehensive understanding of the underlying determinants. Intervention studies can assess the effectiveness of specific strategies, and incorporating multiple stakeholder perspectives can offer a holistic understanding of implementation barriers and opportunities. By addressing these areas, researchers can contribute to existing knowledge and offer practical recommendations for promoting sustainable practices in online distance learning institutions, contributing to a more environmentally conscious and sustainable future.

Acknowledgment

The authors would like to thank Open University Malaysia for providing a research grant (OUM-IRF-2023-010) to conduct this study.

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