

Online collective efficacy and its relationship with organizational sustainable development in higher education

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ABSTRACT

Digital transformation in higher education has intensified reliance on online collaboration, yet the role of shared digital capability beliefs in driving institutional sustainability remains underexplored. This study examined the relationship between online collective efficacy (OCE) and organizational sustainable development (OSD) among faculty members in Egyptian higher education. Using a quantitative correlational design, a purposive sample of 647 faculty members and teaching assistants from Al-Azhar University completed two validated instruments: the OCE scale and the OSD questionnaire. Pearson correlation and multiple regression analyses revealed exceptionally strong positive associations between all OCE dimensions and OSD outcomes ($r=.887$, $p<.001$), with the six dimensions collectively explaining 78.8% of variance, $F(6, 640)=396.225$, $p<.001$. Social presence-community level demonstrated the strongest predictive contribution ($\beta=.241$), with community-level perceptions consistently outperforming participant-level perceptions across all dimensions. The study contributes by establishing OCE as an integrative psychological mechanism bridging digital transformation and sustainability outcomes within Bandura's social cognitive theory framework, offering the first empirical evidence of this relationship in Egyptian higher education. Institutionally, leaders should prioritize cross-functional digital communities and collaborative platforms to foster collective efficacy as a driver of sustainability transformation.

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1. INTRODUCTION

Organizational sustainable development (OSD) in higher education represents a comprehensive, whole-institution transformation whereby universities align their governance, strategy, culture, operations, teaching, research, and external engagement with sustainable development principles and goals [1], [2]. This paradigm shift extends beyond traditional “greening” initiatives-such as energy efficiency and recycling-which dominated earlier sustainability efforts but often remained isolated from core institutional functions [3], [4]. Contemporary OSD positions sustainability as a strategic organizational imperative that integrates environmental, social, and economic dimensions across all university missions, explicitly aligning with the United Nation 2030 agenda and sustainable development goals [5], [6]. Universities now frame sustainability not merely as operational improvements but as fundamental to institutional purpose,

educational quality, and societal transformation, requiring systemic changes in organizational structures, cultures, and networks to address climate crisis, social inequality, and institutional resilience [7], [8].

Digital transformation has fundamentally restructured academic collaboration, making digital platforms central to institutional survival and long-term impact in higher education. Universities now operate as digital institutions, where learning management systems, cloud-based tools, and social media platforms mediate teaching, research, governance, and outreach activities among students, faculty, and external partners [9]–[11]. These digital enablers create scalable, flexible delivery systems that enhance institutional agility, decision-making quality, and alignment with strategic goals, directly affecting organizational resilience and effectiveness [12], [13]. Cross-institutional networks and collaborative digital spaces facilitate co-creation, knowledge sharing, and resource pooling that address global challenges beyond individual institutional capacity [14]–[16]. Without coordinated, system-level digital collaboration across faculties, IT units, and partner universities, institutions risk fragmented initiatives that threaten competitiveness in an increasingly digitized knowledge economy [17], [18].

Online collective efficacy (OCE) represents a shared belief among members of a digital group that they can effectively achieve common goals through coordinated action via digital tools and interactions [19], [20]. Unlike individual self-efficacy or objective group capacity, OCE reflects the perceived collective capability to accomplish objectives through digitally mediated communication and collaboration in learning platforms, videoconferencing, forums, and social media [21], [22]. In professional academic settings, OCE operates through interconnected processes including social presence—the perception that others are psychologically present in virtual spaces—group cohesion, and collaborative engagement that foster effective problem-solving and learning performance [23], [24]. Higher OCE strengthens motivational commitment to group missions, promotes knowledge sharing and active participation, and supports informal social control mechanisms that reinforce constructive norms and mutual support within online academic communities [25], [26].

In labor-intensive higher education institutions, faculty members, demonstrators, and assistant lecturers constitute the primary workforce driving both current operations and long-term institutional sustainability. Faculty members serve as the strategic, educational, and knowledge-creation backbone, designing curricula that integrate sustainability content, conducting research that generates sustainability-relevant solutions, and shaping students' competencies and values for future professional practice [5], [27], [28]. Their awareness and commitment are crucial for embedding sustainability as a core institutional priority rather than peripheral initiative [29]–[31]. Conversely, assistant lecturers and demonstrators—referred to as *Heia'a Mo'awena* in the Egyptian context—provide the operational and implementation backbone, possessing technical expertise essential for translating sustainability policies into concrete campus practices in resource management, operations, and support systems [32]–[34].

Recent technological advancements in Egypt have substantially transformed faculty collaborative behaviors, forcing a transition from predominantly face-to-face cooperation to screen-mediated collective environments. Egypt's sustained investment in ICT infrastructure since the mid-1980s, coupled with the 2016 launch of the Egyptian Knowledge Bank and Ministry-driven learning management systems, established foundational digital capabilities [35], [36]. The COVID-19 pandemic accelerated this shift, with public universities initially adopting social networking platforms such as WhatsApp and Facebook as formal distance-learning platforms, followed by the nationwide deployment of Microsoft Teams through government partnerships [37], [38]. This infrastructural evolution normalized platform-based interaction, cloud-based coordination, and distributed cross-institutional collaboration, replacing traditional campus-bounded meetings with synchronous and asynchronous digital exchanges, though hierarchical structures and disciplinary differences continue shaping adoption patterns [15], [17], [37], [39].

The relationship between OCE and OSD can be theoretically explained through Bandura's social cognitive theory, which posits that collective efficacy—a group's shared belief in its conjoint capability to organize and execute actions—emerges through triadic reciprocal determinism involving personal cognition, behavior, and environmental factors [40]–[42]. In digitally mediated academic contexts, high OCE increases motivation, persistence, and coordination quality, driving team processes that enhance performance and institutional resilience [43], [44]. Complementary theoretical perspectives—including resource-based capability theories, connectivism's emphasis on networked knowledge creation, and social exchange theory's focus on reciprocal engagement—collectively explain how repeated successful digital collaboration accumulates social capital, adaptive capabilities, and innovative routines essential for sustainable organizational development [45]–[47].

Despite substantial research demonstrating that individual self-efficacy and offline collective efficacy predict pro-environmental action and evidence that digital platforms facilitate organizational learning for sustainable outcomes, three critical limitations persist [48]–[52]. Prior studies focus exclusively on individual or offline efficacy constructs, overlooking the shared digital nature of contemporary academic

collaboration [48]–[50]. Additionally, existing digital transformation research treats capability as an individual-level construct, ignoring collective digital beliefs [53]–[55]. Most critically, no study has examined how shared beliefs about collective digital capability predict triple-bottom-line sustainability outcomes in higher education, leaving OCE as an entirely unexplored bridging mechanism [56], [57].

Despite substantial theoretical rationale linking OCE to OSD and the extensive digital transformation of Egyptian higher education following COVID-19, no empirical research has directly examined this relationship in the regional context-representing a critical gap at the intersection of digital collaboration research and institutional sustainability frameworks. The present study addresses this critical gap by examining the associations between dimensions of OCE and OSD outcomes among Egyptian university faculty members. Understanding these relationships is essential for informing evidence-based strategies that leverage digital platforms to advance institutional sustainability agendas in resource-constrained developing contexts. Accordingly, this study pursues two primary objectives: first, to investigate the nature and strength of the relationship between OCE dimensions and OSD dimensions among Egyptian university faculty members; and second, to determine the extent to which OCE dimensions predict overall OSD outcomes when controlling for shared variance among predictors. To address these objectives, the study seeks to answer two research questions:

- What is the nature and strength of the relationship between OCE dimensions and OSD dimensions?
- To what extent do OCE dimensions predict OSD outcomes when controlling for shared variance among predictors?

2. METHOD

2.1. Study design

This study employed a quantitative correlational research design, selected as the most appropriate approach for addressing the research objectives and questions. Correlational design is well-suited for examining the nature, strength, and direction of relationships between variables and for determining the predictive contribution of one construct upon another without experimental manipulation, directly aligning with our objectives of investigating associations between OCE dimensions and OSD outcomes. This design is widely established in organizational and educational psychology research when the primary aim is to map relationships among psychological and institutional constructs rather than to establish experimental causation.

2.2. Participants

The study employed a two-stage sampling approach to ensure robust psychometric validation of the research instruments. A purposive sampling strategy was selected because the study required participants with direct experience of online collaboration in academic settings, making random sampling inappropriate for capturing the target psychological constructs [58]. This approach is well-established in organizational psychology research where construct-relevant expertise is a prerequisite for valid self-report measurement [59]. The psychometric validation sample comprised 473 faculty members and teaching assistants from Al-Azhar University, whereas the main study sample comprised 647 participants from the same institution. The sample size was determined to satisfy the recommended minimum ratio of 10 participants per measured variable for regression analysis [60], ensuring sufficient statistical power for the planned analyses. All participants were recruited via a verified WhatsApp group exclusively for university faculty members, in which institutional affiliation was verified using official identification cards. The questionnaire was administered electronically via Google Forms during September 20-30, 2025, in the first semester of the 2025-2026 academic year. Table 1 presents the comprehensive demographic characteristics of both samples, including academic rank, gender, self-reported digital skills level, and participation in digital transformation workshops.

2.3. Instrument development

The OCE scale developed by Glassman *et al.* [61] was used to assess participants' perceptions of their collective efficacy in online learning communities. The scale is grounded in a six-dimensional theoretical model reflecting individual perceptions at two levels (participant and community) across three fundamental dimensions of online community engagement: social presence, engagement, collaboration and augmentation. Each dimension operates at both participant and community levels, yielding the six subscales. The scale uses a seven-point Likert response format ranging from 1 (not at all true) to 7 (completely true). Confirmatory factor analysis in the current study demonstrated excellent model fit indices ($\chi^2/df=1.055$, $GFI=.937$, $CFI=.996$, $RMSEA=.011$), supporting the factorial validity of the six-dimensional structure. Convergent validity was evidenced by average variance extracted (AVE) values ranging from .554 to .622, all exceeding the threshold of .50, while discriminant validity was confirmed as the square root of AVE for each dimension exceeded all inter-dimension correlations. Composite reliability coefficients ranged from

.882 to .902, and Cronbach's alpha coefficients ranged from .881 to .899 across the six dimensions, with total scale reliability of $\alpha=.903$, indicating excellent internal consistency.

The OSD questionnaire was used to assess institutional commitment to sustainable development practices [62]. The instrument comprises 41 items distributed across seven dimensions based on the triple bottom line theory integrating economic, social, and environmental performance: continuous improvement and learning, environmental stewardship, social responsibility, governance and ethics, economic viability, integration and alignment, and stakeholder engagement. Responses are recorded on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Confirmatory factor analysis yielded satisfactory fit indices ($\chi^2/df=1.030$, $GFI=.927$, $CFI=.997$, $RMSEA=.008$), confirming the seven-factor structure. Convergent validity was established, with AVE values ranging from .503 to .526, which meet acceptable thresholds, and discriminant validity was supported by the Fornell-Larcker criterion. Composite reliability coefficients ranged from .832 to .871 across dimensions, and Cronbach's alpha coefficients ranged from .831 to .871, with total scale reliability of $\omega=.888$, demonstrating strong internal consistency and measurement reliability. Self-report instruments were chosen because both constructs are perceptual and psychological in nature, making participant self-assessment the most valid measurement approach.

Table 1. Demographic characteristics of study participants

Variable	Category	Psychometric sample (N=473)		Main sample (N=647)	
		N	%	N	%
Academic rank	Demonstrator	50	15.9	60	10.6
	Assistant lecturer	95	30.2	107	18.8
	Lecturer	100	31.7	120	21.1
	Associate professor	56	17.8	156	27.5
	Professor	14	4.4	125	22.0
Gender	Male	213	67.6	406	71.5
	Female	102	32.4	162	28.5
Digital skills level	Advanced	132	41.9	210	37.0
	Intermediate	149	47.3	226	39.8
	Beginner	34	10.8	132	23.2
Participation in digital transformation workshops	Yes	191	60.4	333	58.6
	No	124	39.4	235	41.4

2.4. Data analysis

Data were analyzed using statistical package for the social sciences 27 (SPSS-27) and analysis of moment structures 26 (AMOS-26). The analytical sequence was directly aligned with the two research questions: Pearson correlation coefficients addressed research question 1 by examining the nature, strength, and direction of bivariate relationships between all OCE and OSD dimensions; multiple regression analysis addressed research question 2 by determining the unique predictive contribution of each OCE dimension to overall OSD while controlling for shared variance among predictors. Confirmatory factor analysis in AMOS assessed factorial validity and measurement properties of both instruments prior to main analyses. Multicollinearity was examined through variance inflation factor (VIF) values and tolerance statistics to ensure the integrity of regression estimates. Standardized regression coefficients (β) were interpreted to enable meaningful comparison of the relative predictive importance of each OCE dimension.

3. RESULTS

Preliminary analyses examined the distributional properties and bivariate associations among study variables. As presented in Table 2, Pearson correlation coefficients revealed statistically significant positive relationships between all six dimensions of OCE and the seven dimensions of OSD (all $p<.001$). The correlations between OCE dimensions ranged from moderate to strong ($r=.485$ to $r=.592$), while correlations among OSD dimensions ranged from $r=.511$ to $r=.625$. The composite OCE score demonstrated substantial positive correlations with all OSD dimensions, with correlation coefficients ranging from $r=.655$ to $r=.739$. Similarly, the composite OSD score correlated strongly with all OCE dimensions, ranging from $r=.670$ to $r=.735$. The overall correlation between the total OCE score and total OSD score was exceptionally strong ($r=.887$, $p<.001$), suggesting a robust positive association between faculty members' shared beliefs in their digital collective capability and institutional sustainable development outcomes. These correlational patterns provide preliminary support for the hypothesized relationship between OCE and OSD in the Egyptian higher education context.

Table 2. Correlation matrix of OCE and OSD dimensions

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SP_PL	1														
SP_CL	.54**	1													
E_PL	.53**	.53**	1												
E_CL	.58**	.59**	.56**	1											
CA_PL	.51**	.53**	.51**	.576**	1										
CA_CL	.55**	.55**	.48**	.577**	.51**	1									
OCE_Total	.77**	.80**	.76**	.844**	.75**	.77**	1								
CIL	.53**	.58**	.51**	.583**	.52**	.52**	.69**	1							
ES	.56**	.57**	.52**	.573**	.52**	.56**	.70**	.58**	1						
SR	.56**	.58**	.54**	.572**	.54**	.58**	.71**	.57**	.57**	1					
GE	.53**	.57**	.53**	.589**	.49**	.54**	.69**	.56**	.55**	.55**	1				
EV	.59**	.60**	.58**	.603**	.54**	.56**	.73**	.60**	.62**	.57**	.58**	1			
IA	.50**	.52**	.49**	.549**	.50**	.51**	.65**	.51**	.55**	.55**	.53**	.58**	1		
SE	.56**	.59**	.50**	.609**	.50**	.56**	.71**	.53**	.56**	.55**	.52**	.59**	.57**	1	
OSD_Total	.69**	.73**	.67**	.735**	.65**	.69**	.88**	.77**	.81**	.79**	.77**	.82**	.77**	.77**	1

Note: SP_PL=Social presence-participant level; SP_CL=Social presence-community level; E_PL=Engagement-participant level; E_CL=Engagement-community level; CA_PL=Collaboration and augmentation-participant level; CA_CL=Collaboration and augmentation-community level; OCE_Total=Total OCE; CIL=Continuous improvement and learning; ES=Environmental stewardship; SR=Social responsibility; GE=Governance and ethics; EV=Economic viability; IA=Integration and alignment; SE =Stakeholder engagement; OSD_Total=Total OSD. ** p<.001 (two-tailed).

Multiple regression analysis was conducted to examine whether the six dimensions of OCE significantly predicted overall OSD. The multiple correlation coefficient was $R=.888$, indicating a very strong relationship between the predictor variables and the criterion variable. The coefficient of determination ($R^2=.788$) indicates that the six OCE dimensions accounted for 78.8% of the variance in OSD, with minimal shrinkage in the adjusted R^2 (0.786). The standard error of estimate was 8.88, reflecting reasonable prediction precision given the scale of the dependent variable.

The overall statistical significance of the regression model is presented in Table 3, which displays the analysis of variance for the regression equation. As shown in Table 3, the regression model was statistically significant, $F(6, 640)=396.225$, $p<.001$, indicating that the set of OCE dimensions significantly predicted OSD beyond what would be expected by chance. The substantial F-ratio indicates the strength of the overall predictive relationship and confirms that the OCE dimensions, as a set, meaningfully explain variation in institutional sustainability outcomes.

Table 3. ANOVA for regression model predicting OSD

Source	Sum of squares	df	Mean square	F	Sig.
Regression	187471.277	6	31245.213	396.225	.000
Residual	50468.667	640	78.857	-	-
Total	237939.944	646	-	-	-

The individual contributions of each OCE dimension are detailed in Table 4, which presents the unstandardized and standardized regression coefficients along with their statistical significance tests. All six OCE dimensions emerged as statistically significant independent predictors of OSD (all $p<.001$), even when controlling for shared variance among predictors. Examination of the standardized regression coefficients (β) revealed differential predictive contributions, with social presence-community level demonstrating the strongest unique contribution ($\beta=.241$, $t=9.498$, $p<.001$), suggesting that faculty perceptions of the entire community's psychological presence in digital spaces most powerfully predicted institutional sustainable development outcomes. Engagement-community level ($\beta=.203$, $t=7.610$, $p<.001$), collaboration and augmentation-community level ($\beta=.202$, $t=8.163$, $p<.001$) showed nearly equivalent substantial contributions. Social presence-participant level exhibited a moderate positive effect ($\beta=.181$, $t=7.212$, $p<.001$), while engagement-participant level ($\beta=.167$, $t=6.891$, $p<.001$), collaboration and augmentation-participant level ($\beta=.127$, $t=5.227$, $p<.001$) demonstrated relatively smaller but still meaningful contributions. The pattern of standardized coefficients suggested that community-level perceptions of OCE generally exerted stronger predictive effects than participant-level perceptions, though both levels contributed uniquely to explaining variance in OSD.

The consistent statistical significance across all dimensions underscores the multidimensional nature of OCE's relationship with institutional sustainability outcomes in Egyptian higher education. The regression results confirm that both participant-level and community-level perceptions across social presence, engagement, and collaboration dimensions independently predict OSD, with community-level perceptions

generally demonstrating stronger predictive power. These findings support the theoretical proposition that shared beliefs about collective digital capability play a crucial role in advancing institutional sustainability objectives.

Table 4. Regression coefficients for OCE dimensions predicting OSD

Predictor	B	SE	β	t	p
(Constant)	-18.064	3.517		-5.137	.001
Social presence-participant level	0.951	0.132	.181	7.212	.001
Social presence-community level	1.004	0.106	.241	9.498	.001
Engagement-participant level	0.838	0.122	.167	6.891	.001
Engagement-community level	0.745	0.098	.203	7.610	.001
Collaboration and augmentation-participant level	0.748	0.143	.127	5.227	.001
Collaboration and augmentation-community level	0.959	0.117	.202	8.163	.001

4. DISCUSSION

The current study's findings reveal a robust and multidimensional relationship between OCE and OSD in Egyptian higher education. The exceptionally strong correlation ($r=.887$) and substantial explained variance ($R^2=.788$) demonstrate that faculty members' shared beliefs in their collective digital capability are strongly associated with institutional sustainability outcomes. The differential predictive contributions of the six OCE dimensions highlight the multifaceted nature of this relationship, with community-level perceptions consistently outperforming participant-level perceptions in predicting sustainable development. Social presence-community level emerged as the strongest predictor ($\beta=.241$), suggesting that perceptions of the entire academic community's psychological presence in digital environments most powerfully drive institutional sustainability initiatives. This pattern indicates that collective-level cognitive processes, rather than individual digital self-perceptions, are the primary mechanisms linking online collaboration capabilities to triple-bottom-line sustainability outcomes across governance, environmental stewardship, social responsibility, and economic viability.

These findings extend existing theoretical frameworks linking efficacy beliefs to sustainable outcomes while addressing a critical empirical gap. Consistent with several studies [48]–[50], who demonstrated that individual self-efficacy and offline collective efficacy predict pro-environmental action, the current study confirms that OCE similarly predicts institutional sustainability engagement. The results align with social cognitive theory's triadic reciprocal determinism, demonstrating how shared digital capability beliefs interact with collaborative behaviors and institutional environments to produce sustainability outcomes [40]–[42]. Furthermore, the findings corroborate resource-based capability theories and connectivism perspectives by showing how repeated successful digital collaboration accumulates social capital and adaptive capabilities essential for OSD, particularly in digitally transformed Egyptian universities following COVID-19-accelerated platform adoption [37], [38], [45]–[47].

The findings carry substantial theoretical and practical implications for higher education institutions pursuing sustainability transformations. Theoretically, the study establishes OCE as a critical psychological mechanism bridging digital transformation and OSD, addressing the conceptual gap identified by [56], [57], regarding shared digital capability beliefs and triple-bottom-line outcomes. Practically, the dominance of community-level perceptions suggests that institutional leaders should prioritize interventions fostering collective rather than individual digital competencies through cross-functional digital communities, collaborative sustainability projects using platforms like Microsoft Teams, and visible institutional narratives celebrating community-wide digital achievements. Universities should strategically invest in enhancing social presence across digital platforms, particularly creating opportunities for faculty to perceive their colleagues as psychologically present and engaged in shared sustainability missions. The Egyptian context demonstrates that even in hierarchical academic cultures with emerging digital infrastructure, cultivating OCE can substantially advance institutional sustainability agendas.

The findings carry important implications for educational practice and policy in higher education. At the institutional level, university administrators and policymakers should formally incorporate OCE development into digital transformation strategies, treating it as a measurable institutional outcome rather than an incidental byproduct of platform adoption. Practically, universities should establish structured cross-functional digital communities that bring together faculty across departments for collaborative sustainability projects using platforms such as Microsoft Teams, thereby simultaneously strengthening social presence, engagement, and collaboration. At the policy level, national higher education authorities in Egypt and comparable developing contexts should mandate digital collaboration competency frameworks within faculty development programs and allocate dedicated funding for community-level digital capacity building.

Performance evaluation systems should be expanded to include indicators of collective digital engagement alongside traditional individual productivity metrics, incentivizing the collaborative behaviors that this study identifies as critical drivers of institutional sustainability outcomes.

Several limitations warrant consideration when interpreting these findings. The correlational cross-sectional design, while aligned with the study's objectives, precludes causal inferences, and reliance on self-report measures introduces potential common method variance, leaving reciprocal relationships between OCE and OSD theoretically plausible; longitudinal designs could establish temporal precedence and developmental trajectories. The exclusive reliance on self-report measures introduces potential common method variance, though the use of validated instruments with strong psychometric properties partially mitigates this concern. The sample's restriction to Al-Azhar University faculty limits generalizability to other Egyptian universities with different organizational cultures, resource levels, or digital infrastructures, and particularly to international contexts where technological adoption patterns and collectivist cultural values may differ substantially. The study did not examine potential moderating variables such as disciplinary differences, prior digital experience, or institutional support structures that might influence the OCE sustainability relationship. Additionally, the regression model, despite explaining substantial variance, leaves 21.2% unexplained, suggesting other unmeasured factors contribute to OSD outcomes.

Future investigations should employ longitudinal and experimental designs to establish causal pathways and test interventions specifically designed to enhance OCE for sustainability outcomes. Researchers should examine potential mediating mechanisms such as knowledge sharing quality, collaborative innovation processes, or institutional trust that might explain how OCE translates into sustainable development practices. Cross-institutional and cross-cultural comparative studies would illuminate whether the observed relationships generalize beyond Egyptian higher education or require cultural adaptation. Investigating moderating variables including academic discipline, career stage, institutional type, and specific digital platform affordances would reveal boundary conditions and interaction effects. Mixed-methods approaches incorporating qualitative interviews and observational data could provide richer understanding of how faculty experience and enact OCE in sustainability initiatives. Finally, examining relationships between specific OCE dimensions and particular sustainability domains (environmental, social, economic) rather than aggregate scores would offer more nuanced theoretical insights and targeted practical guidance.

5. CONCLUSION

This study provides compelling evidence that OCE represents a powerful predictor of OSD in Egyptian higher education, with faculty shared beliefs about digital collective capability explaining nearly 79% of variance in institutional sustainability outcomes. The consistent significance of all six OCE dimensions, particularly community-level perceptions of social presence, engagement, and collaboration, underscores the multidimensional nature of this relationship and highlights digital platforms as critical infrastructures for sustainability transformation. As universities worldwide navigate simultaneous digital and sustainability transitions, cultivating robust OCE emerges as a strategic imperative rather than peripheral concern. The findings offer actionable insights for institutional leaders seeking to leverage digital transformation as a catalyst for comprehensive sustainability agendas while contributing theoretical advancement by integrating social cognitive theory with organizational sustainability frameworks in digitally mediated contexts. Future research expanding these foundations will further illuminate pathways through which collective digital capabilities drive institutional resilience, innovation, and societal impact.

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AUTHOR CONTRIBUTIONS STATEMENT

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

INFORMED CONSENT

Informed consent was obtained from all participants involved in the study.

ETHICAL APPROVAL

The study protocol was approved by the Research Ethics Committee of the Faculty of Education, Al-Azhar University, Egypt (Ref. No. EDU-REC-2024-846).

DATA AVAILABILITY

The data are available from the corresponding author, [MAN], upon reasonable request.

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