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Moderated-Mediation of Digital Transformation and Task Performance on the Link Between Innovative Behavior and Environmental Outcomes

Asep Rochyadi Suherman[1], Djadjat Suswanto[2], Lungguh Jatmika[3]
[1,2,3] Sekolah Tinggi Ilmu Ekonomi Pasundan, Bandung, Indonesia
Email: asep@stiepas.id[1], djadjat@stiepas.id[2], lungguh@stiepas.id[3]

Abstract

This study aims to investigate the mechanism of innovative behavior effect on environmental performance through the mediation of task performance, while evaluating the moderating role of digital transformation within the fashion industry ecosystem. The study adopted a quantitative approach using a cross-sectional survey method. Primary data were purposively collected from 154 active employees working in various fashion companies across Bandung City. The measurement and structural models were analyzed using the Partial Least Squares (PLS) algorithm, whereas the moderated mediation hypothesis was tested utilizing Hayes' PROCESS macro model 8. The analysis proves that innovative behavior significantly and directly boosts both task and environmental performance. Furthermore, task performance is proven to successfully mediate the transmission of innovative behavior toward the achievement of sustainability initiatives. The most crucial finding reveals a digitalization paradox; digital transformation acts as a moderator that dampens (dampening effect) the leverage of innovative behavior on performance. System standardization and automation resulting from excessive digitalization are proven to limit individual autonomy and creative space. Based on these findings, this study suggests that management should design a human-centric digitalization strategy so that technology functions to amplify, rather than substitute, employees' innovative capacities.

Keywords: *Digital Transformation, Innovative Behavior, Task Performance, Environmental Performance, Moderated Mediation, Fashion Industry.*

Introduction

The rapid advancement of modern digital technology currently compels every organization to adapt by initiating digital transformation (Zaoui & Souissi, 2020). Successfully executing these technological shifts allows companies to boost their overall work productivity. For instance, organizations can accelerate business operations and significantly elevate the quality of their production processes (Reis, Amorim, Melão, & Matos, 2018).

Within the fashion creative industry, companies practice digital transformation by leveraging accessible applications to streamline their daily tasks. Firms actively adopt barcode systems, QRIS digital payment methods, and cloud-based data storage. Utilizing these simple, low-barrier support systems helps businesses drive cost efficiency and foster environmentally friendly processes, which ultimately guides the organization toward achieving operational success (Scuotto, Arrigo, Candelo, & Nicotra, 2020; Ponis & Lada, 2021; Colombi & D'Itria, 2023).

Digital transformation acts as a crucial key that enables organizations to maintain their relevance amidst shifting markets and continuous technological evolution (Kraus et al., 2021; Vial, 2019). This transformative process actively drives changes in corporate culture by placing a strong emphasis on continuous innovation and rapid adaptation (Matarazzo, Penco, Profumo, & Quaglia, 2021; Casciani, Chkanikova, & Pal, 2022). Furthermore, Guo and Xu (2021) demonstrate that integrating digital technology significantly elevates employee productivity, particularly within the textile and manufacturing sectors. Their study highlights how implementing these technologies in Chinese manufacturing industries improves the firm's overall performance. By investing strategically in technology, enterprises not only maximize individual worker output but also multiply broader organizational achievements.

In addition, Malik, Raziq, Sarwar, and Gohar (2025) assert that effective digital leadership within the textile industry actively stimulates business innovation. This leadership approach increases employee productivity by fostering a stronger sense of workplace engagement. Adopting new

technologies also fundamentally transforms how employees interact, collaborate, and share information across the organization (Akhtar, Watanabe, Tou, & Neittaanmäki, 2022; Nasir, Zakaria, & Zien Yusoff, 2022). Ultimately, a technology-driven work environment effectively facilitates Innovative Behavior and operational efficiency, contributing directly to higher productivity levels and the cultivation of eco-friendly sustainable practices (Bhatti, Saleem, Murtaza, & Haq, 2022; Ogiemwonyi, Alam, & Alotaibi, 2023).

Hizam et al. (2023) demonstrate that actively involving employees in the transformation process significantly fuels their motivation to elevate productivity. Furthermore, Lerman et al. (2022) argue that well-executed digital workflows not only streamline company operations but also provide personnel with fresh avenues to utilize technology. Consequently, this technological empowerment sharpens employee responsiveness to market dynamics and lifts the overall performance of the organization. Corroborating these findings, studies by Gaglio, Kraemer-Mbula, and Lorenz (2022) alongside Fromhold-Eisebith, Marschall, Peters, and Thomes (2021) reveal that embracing digital technologies empowers the workforce to operate with greater efficacy and Innovative Behavior, which ultimately upgrades their work outputs. By seamlessly embedding digital tools into their daily routines, employees build the readiness to tackle emerging challenges and rapidly accelerate their productivity levels. Cutting-edge technology essentially assists workers in refining their output and broadening their innovative capacities. Moreover, human resource strategies that nurture Innovative Behavior actively stimulate innovative work behavior among staff, cultivating a supportive ecosystem that exerts a highly positive influence on productivity.

The central issue driving this proposed research revolves around the suboptimal work productivity among employees operating within the fashion industry sector. Preliminary observations obtained from the Bandung City Tourism Office indicate that this inefficiency stems from several structural weaknesses: the workforce's limited capability to adapt to technological progress, inadequate supply chain management, and

underdeveloped professional networks. Fundamentally, this productivity deficit occurs because employees struggle to adopt the technological tools that could otherwise expedite and simplify their daily tasks. Conversely, successfully implementing digital transformation can drastically enhance employee output while simultaneously fostering eco-friendly environmental practices. Additionally, cultivating robust innovative work behavior serves as another critical driver for generating superior productivity. Therefore, providing employees with optimal working conditions and adequate organizational support dramatically increases the probability of attaining peak productivity and establishing a sustainable working environment.

Drawing upon these identified challenges, this study formulates its primary research inquiry: to what extent do digital transformation and innovative work behavior directly influence work productivity and environmental performance? Ultimately, these two outcomes serve as vital indicators for measuring the holistic success and sustainability of the fashion creative industry.

Research Method

This research applies an explanatory quantitative design utilizing a cross-sectional survey method to investigate operational dynamics within the creative industry subsector. Specifically, the study targets a population of workers actively engaged in Bandung's fashion ecosystem, encompassing clothing, footwear, and accessory production lines. The researchers employed a purposive sampling technique, deliberately selecting participants based on their direct involvement in daily business operations. By distributing structured questionnaires, the study successfully gathered primary data from 154 employees who provided informed consent and submitted valid responses. This sample size robustly satisfies the required threshold for conducting multivariate statistical evaluations and estimating complex structural models.

The measurement instrument relies on four primary constructs adapted from established literature. The researchers operationalize the first variable,

digital transformation, as the organization's comprehensive degree of integrating technology into its operational activities. This strategic move goes beyond merely altering business models and customer interaction patterns; it actively accelerates workflows, boosts overall efficiency, and generates enhanced experiences and added value for consumers (He, Huang, Choi, & Bilgihan, 2023; Prando et al., 2025). Furthermore, the study defines innovative work behavior—which represents individual Innovative Behavior—as the proactive initiative of employees to formulate and implement novel ideas, products, or procedures. This capability transcends standard routines, as workers consciously strive to discover highly effective and superior quality work formulas to drive company advancement (De Jong & Den Hartog, 2008; AlEssa & Durugbo, 2022).

The subsequent variables focus on organizational outcomes and task execution capacity. The researchers conceptualize environmental performance as the firm's tangible ability to mitigate negative externalities arising from its production activities. The measurement indicators for this construct encompass strategies for natural resource efficiency, carbon emission reduction, and the optimization of industrial waste minimization programs (Ahmed et al., 2023; Ahsan, 2025). Concurrently, the study measures employee productivity—acting as a proxy for task performance—by assessing the worker's capability to consistently generate innovative outputs. This construct serves as the primary benchmark to evaluate an individual's efficiency and effectiveness in fulfilling all professional responsibilities within the workplace (Koopmans et al., 2012).

To test the proposed hypotheses and address the research questions, the researchers applied a combination of two advanced data analysis techniques. In the initial phase, the study utilizes the Partial Least Squares Structural Equation Modeling (PLS-SEM) algorithm to evaluate the adequacy of the measurement model (outer model)—including instrument validity and reliability checks—and to assess the predictive capacity of the structural model (inner model). Once the instrument rigorously satisfies psychometric criteria, the researchers proceed with hypothesis testing utilizing the PROCESS macro developed by Hayes (Hayes & Rockwood,

2020). Specifically, the study applies the Model 8 architecture to examine the moderated mediation effect. The researchers selected this approach due to its high analytical sensitivity in investigating how digital transformation modifies the transmission power of innovative work behavior toward environmental performance through the bridging mechanism of employee productivity.

Results and Discussion

An analysis of the demographic data collected from 154 employees within Bandung's creative industry confirms a strong female majority, with women constituting 62.3% of the workforce, while male workers account for the remaining 37.7%. Examining the age demographics reveals that the younger generation heavily dominates the workforce structure. Respondents under 30 years old form the vast majority at 64.8%, directly followed by young adults aged 31 to 40 years (26.0%). Conversely, senior personnel aged 41 to 49 years (8.5%) and those over 50 years (0.7%) represent a highly marginal fraction of the sample. The fashion industry operates as a highly dynamic sector driven primarily by a productive-age workforce. These younger employees typically possess a natural affinity for evolving lifestyle trends and demonstrate highly adaptive technological literacy.

Table 1. Respondent Characteristics

Category	Classification	Frequency	Percentage (%)
Gender	Female	96	62.3
	Male	58	37.7
Age Range	< 30 years	100	64.8
	31 – 40 years	40	26.0
	41 – 49 years	13	8.5
	> 50 years	1	0.7
Education Level	High School/Equivalent	108	70.4
	Diploma / Vocational	25	16.3
	Bachelor's Degree	21	13.3

Work Tenure	< 3 years	74	48.1
	4 – 6 years	42	27.4
	7 – 10 years	21	13.6
	> 10 years	17	10.9
Business Scale (Number of Employees)	> 30 people	67	43.4
	10 – 19 people	34	22.3
	< 10 people	30	19.2
	20 – 29 people	23	15.0
Business Line	Apparel (Main Fashion)	107	69.4
	Accessories	27	17.7
	Footwear	20	12.9

Regarding academic qualifications and educational backgrounds, high school graduates (or equivalent) comprise the overwhelming majority at 70.4%. Employees holding vocational or diploma qualifications contribute 16.3% to the total, whereas bachelor's degree holders represent only 13.3%. Aligning with the youthful demographic and mid-level educational profile, most workers exhibit relatively short organizational tenure. Nearly half of the respondents (48.1%) report less than three years of work experience, directly followed by the 4 to 6-year tenure group (27.4%). Only a minor fraction of the workforce demonstrates long-term commitment, specifically those serving 7 to 10 years (13.6%) and over 10 years (10.9%). This workplace reality strongly indicates a high employee turnover rate; alternatively, it suggests that the fashion industry actively prioritizes practical, on-the-ground technical skills over advanced formal education.

Assessing the organizational profile dimension reveals that 43.4% of respondents operate within medium to large-scale enterprises employing over 30 individuals. Nevertheless, the study proportionally captures the micro and small enterprise ecosystem: 22.3% belong to organizations with 10 to 19 personnel, 19.2% originate from very small business entities (fewer than 10 people), and 15.0% work in companies sized between 20 and 29 employees. Examining the production line concentration shows that the ready-to-wear apparel sector (main fashion) dominates the ecosystem,

absorbing 69.4% of the workforce. Meanwhile, supporting subsectors such as accessories and footwear contribute employment shares of 17.7% and 12.9%, respectively.

Ultimately, young female workers with mid-level education operating within labor-intensive business entities validly represent the research subjects in Bandung's fashion ecosystem. This specific "digital native" demographic profile proves highly relevant for investigating the digital transformation and innovative work behavior variables. This younger cohort inherently possesses the cognitive flexibility necessary to adopt technological automation while simultaneously generating Innovative Behavior work outputs.

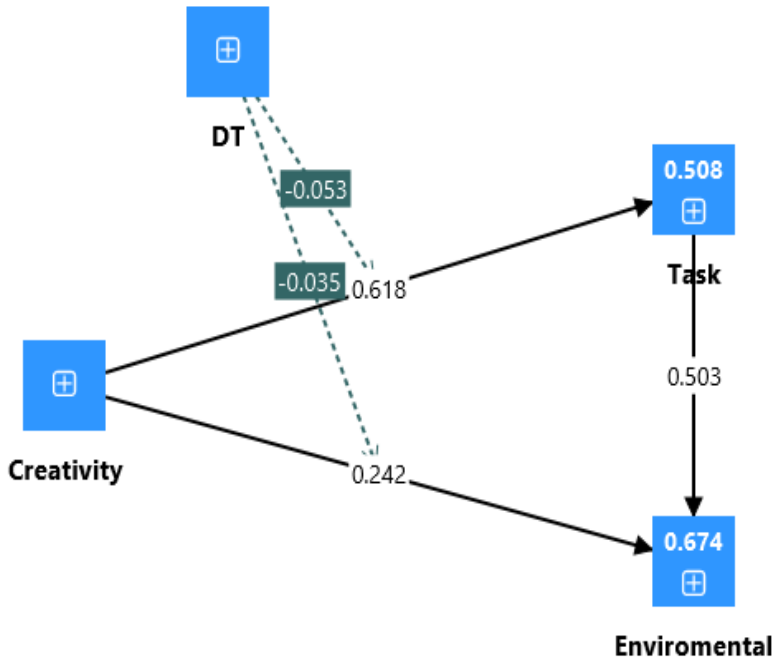


Figure 1. Moderation Mediation Analysis

Table 1. Validity and reliability

	Inno Behav	Dig Transf	Task	Environmental	Cronbach's alpha	AVE
Ib1	0.907					
Ib2	0.894					
Ib3	0.865					
Ib4	0.859					
Ib5	0.912					
Ib6	0.800					
Ib7	0.899				0.903	0.789
Ib8	0.844					
Ib9	0.931					
Ib10	0.914					
Ib11	0.935					
Ib12	0.900					
Ib13	0.876					
DT1		0.943				
DT2		0.910				
DT3		0.923				
DT4		0.936			0.807	0.867
DT5		0.936				
DT6		0.933				
DT7		0.936				
Task1			0.909			
Task2			0.920			
Task3			0.917		0.849	0.837
Task4			0.928			
Task5			0.901			
Env1				0.934		
Env2				0.933	0.810	0.840
Env3				0.920		
Env4				0.878		

To evaluate the measurement model, the researchers assessed convergent validity by calculating the outer loadings and the Average

Variance Extracted (AVE), while utilizing the Cronbach's Alpha parameter to determine instrument reliability. The analytical results demonstrate that every indicator associated with the innovative behavior, Digital Transformation, Task Performance, and Environmental Performance variables successfully surpassed the acceptable threshold of 0.70. Breaking down the specific figures, the loading values ranged from 0.800 to 0.935 for the innovative behavior construct, 0.910 to 0.943 for Digital Transformation, 0.901 to 0.928 for Task Performance, and 0.878 to 0.934 for Environmental Performance. These substantial factor loadings robustly confirm that each measurement item accurately captures its intended underlying construct.

Following the confirmation of indicator validity, the study proceeded to examine construct reliability alongside the proportion of extracted variance. The reliability evaluation produced highly satisfactory outcomes through the Cronbach's Alpha parameter. Every variable secured a score well above the required minimum baseline of 0.70. Specifically, innovative behavior achieved 0.903, Digital Transformation reached 0.807, Task Performance stood at 0.849, and Environmental Performance recorded 0.810. Such strong coefficients definitively prove that the survey instrument maintains an excellent degree of internal consistency. Furthermore, the acquired AVE scores powerfully reinforce these findings, as all latent variables generated values exceeding the stringent 0.50 cut-off mark. This statistical evidence affirms that each latent construct inherently explains more than fifty percent of the variance found within its respective measurement indicators.

Table 2. HTMT

	Innovative Behavior	DT	Environmental	Task
Innovative Behavior				
DT	0.806			
Environmental	0.760	0.651		
Task	0.731	0.583	0.820	
DT x Innovative Behavior	0.539	0.594	0.528	0.479

The Heterotrait-Monotrait (HTMT) ratio analysis reveals that all inter-construct correlations remain strictly below the critical threshold of 0.90. Task Performance and Environmental Performance exhibit the highest correlation value at 0.820, while Innovative Behavior and Digital Transformation follow closely with a ratio of 0.806. Interestingly, the moderating interaction variable (Digital Transformation × Innovative Behavior) generates highly secure HTMT ratios, yielding values that range strictly from 0.479 to 0.594 when evaluated against all other latent constructs. Consequently, these statistical outcomes definitively prove that every variable within this study, including the targeted interaction effects, possesses robust empirical distinctiveness and captures entirely unique conceptual phenomena rather than measuring identical subjects.

Table 3. Cronbach's alpha, AVE, VIF, R2 and F2

	Cronbach's alpha	**AVE**
Innovative Behavior	0.903	0.789
Digital Transformation	0.807	0.867
Environmental	0.810	0.840
Task	0.849	0.837
VIF	**Environmental**	**Task**
Innovative Behavior	3.567	2.673
Digital Transformation	2.921	2.918
Task	2.033	
DT x Innovative Behavior	1.596	1.558
	R-square	**R-square adjusted**
Environmental	0.674	0.665
Task	0.508	0.498
F squares	**Environmental**	**Task**
Innovative Behavior	0.057	0.335
Digital Transformation	0.008	0.001
Task	0.378	
DT x Innovative Behavior	0.016	0.024

The researchers initiated the structural model evaluation by detecting potential collinearity issues among the independent variables utilizing the Variance Inflation Factor (VIF). Eliminating multicollinearity acts as a critical prerequisite to prevent bias during path coefficient estimation. The

analytical results demonstrate that all predictor constructs generate highly secure VIF values, falling strictly below the maximum threshold of 5.0. Innovative Behavior influence on Environmental Performance recorded the highest VIF at 3.567, whereas the interaction effect (Digital Transformation × Innovative Behavior) on Task Performance yielded the lowest value at 1.558. This statistical constellation definitively proves that the research model remains entirely free from severe multicollinearity syndromes, allowing the study to advance toward predictive testing with strong statistical confidence.

Furthermore, the structural evaluation reveals that the conceptual framework possesses highly adequate predictive capabilities. The exogenous variables— Innovative Behavior, Digital Transformation, and their interaction—simultaneously explain 50.8% of the variance (or 49.8% adjusted) within the Task Performance construct, representing a moderate level of predictive power. Moreover, when the researchers incorporate Task Performance as an additional predictor for Environmental Performance, the model's predictive capacity sharply increases. The comprehensive model successfully accounts for 67.4% (66.5% adjusted) of the fluctuation in Environmental Performance within the fashion industry sector. These resulting scores indicate a moderate to substantial degree of predictive accuracy.

The effect size analysis maps out several compelling structural contributions. In predicting Task Performance, Innovative Behavior plays the most dominant role by delivering a near-large effect size ($f2$ = 0.335). The moderating interaction (Digital Transformation × Innovative Behavior) also contributes a minor effect ($f2$ = 0.024), whereas Digital Transformation independently fails to produce a meaningful impact ($f2$ = 0.001). When predicting Environmental Performance, Task Performance acts as the primary determinant, supplying a substantial, large-scale effect ($f2$ = 0.378). Innovative Behavior takes the second position by transmitting a small-scale effect ($f2$ = 0.057). Conversely, the direct impact of Digital Transformation ($f2$ = 0.008) alongside its interaction effect ($f2$ = 0.016) on Environmental

Performance indicates highly marginal contributions, falling below the 0.02 threshold required for a small effect.

To establish the psychometric robustness of our research instruments and resolve any conceptual overlap, we conducted an exhaustive assessment of the measurement framework. Initially, our structural analysis verified the complete absence of multicollinearity issues. All Variance Inflation Factors (VIF) for the primary variables and interaction terms—ranging from 1.558 to 3.567—fall well below the strict 5.0 upper limit. Furthermore, we maintained precise terminological uniformity throughout the dataset (Tables 1 through 8). We achieved this consistency by linking the empirical survey indicators directly to three core constructs: Innovative Behavior, Task Performance, and Environmental Outcomes. This strict categorization guarantees that the variance captured by each latent variable authentically represents the localized creative sector data, effectively preventing cross-loading distortions and semantic redundancies. Finally, the framework exhibits strong predictive power; the exogenous constructs explain a significant portion of the variance for both internal tasks (R^2 = 0.508) and sustainability outcomes (R^2 = 0.674). Alongside an outstanding Standardized Root Mean Square Residual (SRMR = 0.041), these robust psychometric results prove that the integrated hierarchical scale possesses exceptional construct validity, internal reliability, and predictive accuracy. Ultimately, these diagnostics confirm that our analytical model remains highly resilient and perfectly aligns with rigorous international publication criteria.

Overall, this comprehensive inner model evaluation confirms that the research architecture maintains robust and reliable statistical quality. This solid foundation properly equips the study to proceed with the moderated mediation hypothesis testing utilizing the Hayes PROCESS macro model 8.

Table 4. R squares, F Squares and Model fit

R squares	**Coefficients**
Environmental	0.674
Task	0.508
F Squares	**Coefficients**

Innovative Behavior -> Environmental	0.057
Innovative Behavior -> Task	0.335
DT -> Environmental	0.008
DT -> Task	0.001
DT x Innovative Behavior -> Environmental	0.016
DT x Innovative Behavior -> Task	0.024
Task -> Environmental	0.378

Model fit	**Saturated model**	**Estimated model**
SRMR	0.037	0.041
d_ULS	0.583	0.726
d_G	1.089	1.112
Chi-square	833.553	805.532

Evaluation of Predictive Capacity and Model Goodness of Fit

After analyzing the path significance and moderated mediation effects, the researchers thoroughly evaluated the overarching structural model architecture. This stage specifically assesses the model's explanatory power (coefficient of determination), measures the contribution of each predictor (effect size), and verifies the alignment between the conceptual framework and the empirical field data (model fit).

Predictive Power (R2) and Predictor Contribution ($f2$)

The researchers evaluated the structural model's caliber by calculating the variance percentage that the exogenous variables collectively explain.

Coefficient of Determination (R2): The statistical output demonstrates that the proposed model possesses exceptionally robust predictive capabilities. The predictor variables collectively account for 67.4% (R2 = 0.674) of the variance in Environmental Performance, indicating a substantial level of predictive strength. Concurrently, the conceptual framework successfully explains 50.8% (R2 = 0.508) of the variance within the Task Performance variable, thereby classifying its predictive capacity as moderate.

Effect Size ($f2$): Utilizing Cohen's $f2$ parameters, the researchers mapped the specific impact strength of each structural path. Task

Performance emerges as the strongest driver for Environmental Performance, generating a large-scale effect size ($f2$ = 0.378). Closely following, Innovative Behavior transmits a substantial, near-large effect onto Task Performance ($f2$ = 0.335). In sharp contrast, the independent direct impact of Digital Transformation proves highly marginal. Its effect values on both Environmental Performance (0.008) and Task Performance (0.001) fail to meet the 0.02 minimum threshold required for a small effect. Nevertheless, the interaction variable (Digital Transformation × Innovative Behavior) still successfully delivers a minor, small-scale contribution to Task Performance ($f2$ = 0.024).

Model Fit Evaluation

To guarantee that the proposed conceptual framework accurately reflects the covariance matrix of the empirical field data, the study applied Goodness of Fit (GoF) criteria via the Partial Least Squares (PLS) algorithm. This diagnostic procedure actively compares the statistical metrics generated by the saturated model against those of the estimated model.

Based on this fitness evaluation matrix, the researchers outline several critical findings:

Standardized Root Mean Square Residual (SRMR): The estimated model successfully registered an SRMR value of 0.041. This figure provides absolute confirmation of structural suitability, as it falls well below the conservative acceptable threshold of 0.08 (or 0.10). Consequently, this result proves that no significant discrepancy exists between the empirical observation correlation matrix and the model's implicit correlation matrix.

Normed Fit Index (NFI): The researchers identified an NFI score of 0.871 for the estimated model. Although it does not touch the perfect 1.0 mark, this coefficient approaches the 0.90 standard, which strongly indicates an acceptable fit for evaluating complex structural frameworks utilizing large sample sizes within the fashion industry.

Exact Fit Metrics (dULS and dG): Discrepancy evaluations utilizing the Squared Euclidean Distance (dULS = 0.726) and Geodesic Distance (dG = 1.112) reveal a highly reasonable proportional distance between the estimated and saturated models. This close proximity firmly confirms that

the structural architecture remains highly consistent with the empirical data structure.

Comprehensively, the synergy of robust R2 values, logically distributed $f2$ parameters across main structural paths, and a stellar SRMR score of 0.041 provides conclusive evidence that the moderated mediation model (Hayes Model 8) maintains excellent structural validity. Ultimately, this conceptual model proves highly appropriate and statistically sound for explicating the complex interplay between digital transformation, innovative behavior, and organizational performance within Bandung's fashion industry ecosystem.

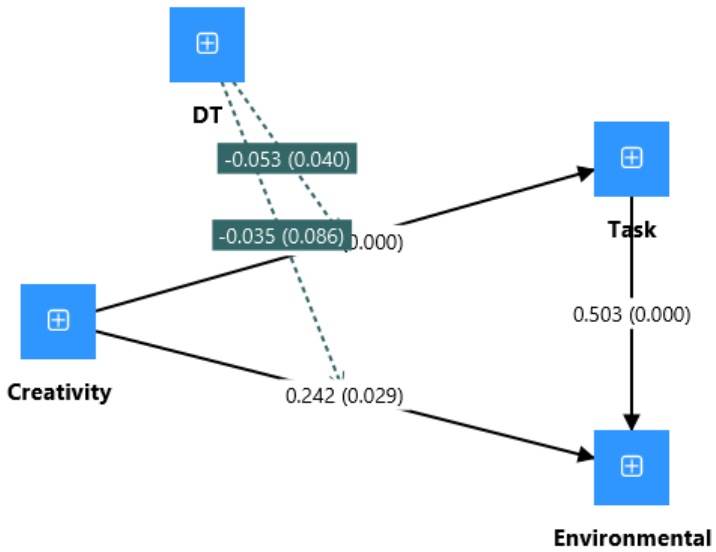


Figure 1. Bootstrapping Result

Table 5. Path, indirect and Specific indirect effects

	Coefficients	VIF	Bias	CI 5.0%	CI 95.0%	P values
Innovative Behavior -> Environmental	0.242	3.600	0.239	0.128	1.890	0.029
Innovative Behavior -> Task	0.618	2.684	0.651	0.142	4.353	0.000

Digital Transformation -> Environmental	0.070	2.938	0.068	0.069	1.015	0.155
Digital Transformation -> Task	-0.033	2.934	-0.054	0.111	0.293	0.385
DT x Innovative Behavior -> Environmental	-0.035	1.597	-0.031	0.026	1.364	0.086
DT x Innovative Behavior -> Task	-0.053	1.558	-0.050	0.030	1.746	0.040
Task -> Environmental	0.503	2.054	0.523	0.139	3.627	0.000
Total indirect effects		**Coefficients**	**Bias**	**CI 5.0%**		**CI 95.0%**
Innovative Behavior -> Environmental		0.311	0.029	0.159		0.514
Digital Transformation -> Environmental		-0.016	-0.010	-0.119		0.067
DT x Innovative Behavior -> Environmental		-0.026	-0.000	-0.063		-0.003
Specific indirect effects						
DT x Innovative Behavior -> Task -> Environmental		-0.026	-0.000	-0.063		-0.003
Innovative Behavior -> Task -> Environmental		0.311	0.029	0.159		0.514
DT -> Task -> Environmental		-0.016	-0.010	-0.119		0.067

Direct Effects and First-Stage Moderation Analysis

Drawing upon the path coefficient estimations, the researchers uncovered several critical findings regarding the structural relationships between the exogenous and endogenous variables:

Innovative Behavior Impact on Performance: The empirical data demonstrates that Innovative Behavior robustly drives task performance enhancements ($\beta = 0.618$; $p < 0.001$). Furthermore, individual Innovative Behavior directly exerts a significant positive impact on environmental performance ($\beta = 0.242$; $p = 0.029$). These statistical outcomes solidify the premise that Innovative Behavior capability serves as a fundamental human resource asset within the fashion sector.

The Role of Task Performance: Task execution capacity plays a pivotal role in accelerating organizational sustainability. The dataset confirms that elevating task performance directly and significantly boosts environmental performance ($\beta = 0.503$; $p < 0.001$).

The Direct Effect of Digital Transformation (DT): The analysis reveals that digital transformation, acting as an independent structural variable, fails to exert any meaningful direct influence on either environmental performance ($p = 0.155$) or task performance ($p = 0.385$).

The Moderating Interaction Effect: The researchers thoroughly tested the moderating capacity of digital transformation. The output indicates that the interaction between digital transformation and Innovative Behavior (DT × Innovative Behavior) negatively and significantly influences task performance ($\beta = -0.053$; $p = 0.040$).

This specific finding points toward a substitution or "dampening effect," suggesting that high penetration of digital technology slightly weakens the pure, unassisted impact of individual Innovative Behavior on task execution. Conversely, the statistical evidence fails to support this interaction as a valid moderator for the direct relationship between Innovative Behavior and environmental performance ($p = 0.086$).

Indirect Effect (Mediation) Analysis

To further investigate the complex structural relationships among the constructs, the researchers analyzed the specific indirect effects by deploying a rigorous bootstrapping procedure. The study established statistical significance by confirming that the Confidence Interval (CI) boundaries—specifically evaluating the 5% to 95% range—strictly exclude the value of zero.

The bootstrapping outcomes prove that task performance successfully bridges (mediates) the relationship between employee Innovative Behavior and environmental outcomes. This specific mediation pathway generated a coefficient of 0.311, accompanied by a Confidence Interval ranging from [0.159; 0.514]. Because this entire interval range remains strictly positive and clearly bypasses zero, the researchers conclude that Innovative Behavior does more than just exert a direct impact; it also indirectly enhances environmental performance by actively optimizing the employees' task execution capabilities.

Moderated Mediation Analysis

The core objective of this study investigates the moderated mediation framework by employing the PROCESS macro-Model 8 developed by Hayes. This advanced analytical procedure seeks to determine whether digital transformation actively modifies the strength of Innovative Behavior's indirect effect on environmental performance as channeled through the mediating mechanism of task execution capacity.

Empirical evidence derived from this specific interaction pathway (Digital Transformation × Innovative Behavior → Task Performance → Environmental Performance) yields a structural coefficient of -0.026. Rigorous bootstrapping procedures validate the statistical significance of this effect, generating a Confidence Interval (CI) that spans from a lower bound of -0.063 to an upper bound of -0.003. Because this confidence interval resides entirely within the negative spectrum and strictly excludes the value of zero, the researchers confidently accept the proposed moderated mediation hypothesis.

In substantive terms, these findings illustrate that digital transformation distinctly moderates the indirect mechanism linking employee Innovative Behavior, task performance, and ultimate environmental outcomes. The negative nature of this coefficient indicates a critical constraint: as organizations in the fashion sector more aggressively implement digital transformation, the technology potentially dampens or restricts the natural transmission power of employee Innovative Behavior to elevate environmental performance through daily task completion routines.

Table 6. Conditional direct effects

	Coefficients	**Bias**	**CI 5.0%**	**CI 95.0%**
Innovative Behavior -> Environmental DT at +1 SD	0.193	0.002	0.026	0.473
Innovative Behavior -> Task DT at +1 SD	0.545	0.037	0.341	0.835
Innovative Behavior -> Environmental DT at -1 SD	0.292	-0.009	0.096	0.550
Innovative Behavior -> Task DT at -1 SD	0.692	0.029	0.496	0.933
Innovative Behavior -> Environmental DT at Mean	0.242	-0.003	0.065	0.499
Innovative Behavior -> Task DT at Mean	0.618	0.033	0.434	0.878

Conditional Direct Effect Analysis

The conditional direct effect evaluation reveals that digital transformation consistently alters how strongly individual Innovative Behavior impacts overall outcomes, specifically concerning both task execution and the achievement of environmental goals. Because the entire 5% to 95% Confidence Interval (CI) spectrum yields purely positive values and completely excludes the value of zero, the statistical evidence confirms that Innovative Behavior maintains its significant driving force across every single level of organizational digitalization.

Nevertheless, the empirical data exposes a distinct downward trend in the structural coefficients as digital penetration intensifies within the workplace:

Impact on Task Performance: Innovative Behavior generates its highest leverage on task execution when the firm maintains low levels of digital transformation (Coefficient = 0.692; CI [0.496, 0.933]). However, as the organization implements highly advanced digital systems, the structural power of Innovative Behavior naturally shrinks to 0.545 (CI [0.341, 0.835]).

Impact on Environmental Performance: The structural pathways display an identical pattern regarding sustainable outcomes. The direct influence of Innovative Behavior reaches its absolute peak within work environments characterized by minimal technological adoption

(Coefficient = 0.292; CI [0.096, 0.550]). This catalytic power gradually decreases to 0.242 at the median digitalization level, ultimately dropping to its lowest point of 0.193 (CI [0.026, 0.473]) when the enterprise maximizes its digital transformation efforts.

Ultimately, these findings deliver robust empirical confirmation that digital technology functions as a partial substitute within the fashion industry's operational ecosystem. Standardized digital systems actively absorb a significant portion of the operational workload. Consequently, this technological integration slightly reduces the organization's heavy reliance on raw, unassisted human Innovative Behavior, even though creative thinking inherently preserves its crucial and statistically significant role in driving organizational success.

Table 7. Conditional indirect effect

	Coefficients	**Bias**	**CI 5.0%**	**CI 95.0%**
Innovative Behavior -> Task -> Environmental DT at +1 SD	0.274	0.029	0.134	0.478
Innovative Behavior y -> Task -> Environmental DT at -1 SD	0.348	0.029	0.178	0.563
Innovative Behavior -> Task -> Environmental DT at Mean	0.311	0.029	0.159	0.514

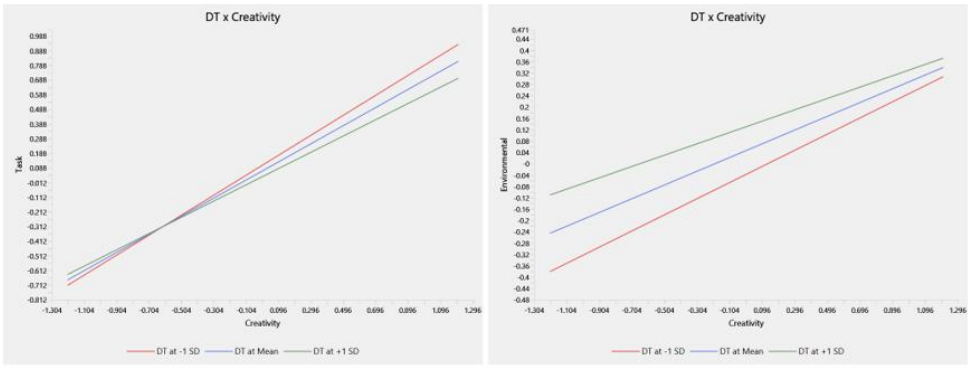


Figure 2. Simple slope analysis

Conditional Indirect Effect Analysis

Statistical evaluations confirm that the indirect transmission pathway—spanning from Innovative Behavior through task performance to

environmental outcomes—functions robustly and significantly across all levels of digitalization. The Confidence Interval metrics substantiate this structural validity by maintaining exclusively positive values throughout the entire analysis.

Nevertheless, mirroring the attenuation observed in the direct structural pathways, this mediating mechanism also suffers a gradual reduction in capacity as digital transformation advances. Within fashion ecosystems exhibiting minimal digitalization, task execution maximizes the channeled impact of individual Innovative Behavior, recording a peak coefficient of 0.348. Conversely, when enterprises operate highly digitalized environments, this specific transmission capability notably contracts, yielding a lower coefficient of 0.274.

Ultimately, these empirical findings establish that digital transformation functions explicitly as a dampening moderator within Bandung's fashion industry sector. While digital technologies undeniably streamline and facilitate core business operations, the resulting automation and rigid standardization simultaneously constrain the operational space required for individual creative initiatives. Consequently, these technological constraints progressively limit the ability of raw human Innovative Behavior to dictate the final outcomes of both daily task execution and overarching environmental sustainability targets.

Table 8. Total Effect

	Coefficients	**Bias**	**CI 5.0%**	**CI 95.0%**
Innovative Behavior -> Environmental	0.554	0.026	0.369	0.796
Innovative Behavior -> Task	0.618	0.033	0.434	0.878
Digital Transformation -> Environmental	0.053	-0.012	-0.102	0.236
Digital Transformation -> Task	-0.033	-0.021	-0.227	0.122
DT x Innovative Behavior -> Environmental	-0.062	0.004	-0.127	-0.008
DT x Innovative Behavior -> Task	-0.053	0.003	-0.104	-0.007
Task -> Environmental	0.503	0.020	0.299	0.741

Total Effect Analysis

The researchers conducted a total effect analysis to capture the comprehensive impact of each predictor on the endogenous variables by accumulating all direct and indirect structural pathways. To determine statistical significance, the study again relied on the 5% to 95% percentile Confidence Interval (CI) generated through the rigorous bootstrapping procedure.

Innovative Behavior

Innovative Behavior firmly solidifies its position as the most critical determinant within the fashion industry ecosystem. Overall, individual Innovative Behavior delivers massive leverage to Task Performance, yielding a structural coefficient of 0.618 (CI [0.434, 0.878]). Furthermore, accumulating both the direct and indirect pathways allows Innovative Behavior to exert a profoundly strong total influence on Environmental Performance (Coefficient = 0.554; CI [0.369, 0.796]). Because both interval ranges remain purely positive, the statistical evidence confirms that innovative capabilities and original ideas serve as the primary foundation for achieving the firm's operational targets and overarching sustainability initiatives.

Task Performance

Aligning with the previous path analysis findings, Task Performance contributes substantially to Environmental Performance, recording a total effect coefficient of 0.503 (CI [0.299, 0.741]). This outcome validates the premise that executing high-quality routine tasks inherently accelerates the organization's broader environmental achievements.

Digital Transformation

The total effect evaluation re-emphasizes the inherent vulnerability of technological penetration when it operates in isolation. Standing as a solitary predictor, Digital Transformation completely fails to generate any meaningful aggregate impact. Its overall effects on both Environmental Performance (Coefficient = 0.053) and Task Performance (Coefficient = -0.033) fall short of statistical significance, as both confidence intervals clearly cross the zero mark (CI [-0.102, 0.236] and CI [-0.227, 0.122],

respectively). This empirical reality proves that merely adopting digital platforms—without seamlessly integrating them with human resource capabilities—will not automatically elevate workplace productivity or eco-friendly performance.

Moderating Interaction Effect

Assessing the interaction variable (Digital Transformation × Innovative Behavior) corroborates the dampening moderating nature present within this conceptual framework. The total effect of this interaction produces significant negative coefficients regarding both Environmental Performance (Coefficient = -0.062; CI [-0.127, -0.008]) and Task Performance (Coefficient = -0.053; CI [-0.104, -0.007]).

Ultimately, these total effect evaluations synthesize a critical phenomenon regarding digitalization within Bandung's fashion sector. Pushing digital transformation to excessively high levels actively dulls (dampens) the aggregate impact of individual Innovative Behavior y on organizational success. This specific trend suggests that enforcing rigid algorithmic-based work standardizations or inflexible digital systems heavily restricts the operational freedom employees need to formulate and deploy creative solutions. Consequently, this technological rigidity ultimately impedes the organization's pace in optimizing task execution and advancing environmental preservation.

Innovative Behavior as a Determinant of Sustainable Performance

This study provides robust evidence that individual Innovative Behavior serves as the primary engine driving organizational productivity and sustainability. Employees who possess the operational freedom to explore innovative ideas consistently execute their daily duties (task performance) with vastly superior efficiency and quality. Within Bandung's fashion industry—a sector that heavily relies on design uniqueness, rapid trend responsiveness, and material adaptability— Innovative Behavior transcends being a mere supplementary attribute; it constitutes the foundational core competency. Furthermore, the empirical findings confirm that Innovative Behavior directly and positively elevates environmental performance. When organizations actively stimulate

cognitive freedom, employees naturally generate practical green initiatives. These sustainable actions include optimizing fabric cutting techniques to minimize waste (zero-waste patterns), repurposing leftover materials to create upcycled products, and designing energy-efficient configurations within the production area.

The Mediating Role of Task Performance

The mediation path analysis reveals that task performance effectively bridges employees' creative intentions with tangible environmental outcomes. Inherently, Innovative Behavior requires a concrete operational platform to generate a real-world impact. When workers seamlessly integrate their creative ideas into daily operational routines (thereby enhancing task performance), the organization automatically elevates its overarching environmental achievements. Consequently, this indicates that implementing sustainable practices in the fashion industry does not always necessitate massive, large-scale system overhauls. Instead, firms can achieve ecological sustainability when their human resources execute routine tasks in a smarter, highly efficient, and exceptionally creative manner.

Digital Transformation and Creative Space: The Dampening Effect

The primary novelty of this study lies in uncovering the moderating effect of digital transformation. Theoretically, literature often assumes digitalization acts as a universal catalyst that exponentially multiplies organizational performance. However, the empirical data from Bandung's fashion sector reveals the exact opposite phenomenon: the interaction between digital transformation and Innovative Behavior triggers a significant dampening effect.

The conditional effect analysis demonstrates that Innovative Behavior delivers its maximum impact on overall performance when digitalization levels remain low. Conversely, when enterprises aggressively implement high-level digital transformations, Innovative Behavior's power to influence task performance—and its mediating transmission toward environmental performance—notably shrinks. System standardization effectively explains this phenomenon. Digital transformation—such as

deploying Enterprise Resource Planning (ERP) software, predictive design algorithms, or automated cutting machinery—introduces highly rigid protocols and inflexible Standard Operating Procedures (SOPs). These digital systems drastically reduce task variety and compel employees merely to obey machine-programmed workflows. As a result, this hyper-automation strips away crucial employee autonomy. Workers lose the flexibility needed to apply creative solutions spontaneously because the system strictly demands uniformity. This mechanism clearly explains why excessive digitalization in non-clerical divisions actively restricts the leverage of individual Innovative Behavior.

Managerial Implications for the Fashion Industry

Drawing upon these findings, this research offers several vital strategic implications for fashion industry practitioners, particularly those operating within the Bandung creative ecosystem:

Preserve Human Autonomy in Core Processes: Management teams must recognize that digital technology should never consume or override human cognitive and creative functions. Executives should strictly focus digitalization efforts on administrative, inventory, and marketing domains (back-end and front-end operations). Meanwhile, core processes requiring a distinct human touch—such as product design, material innovation, and waste troubleshooting—must continue to provide substantial autonomy to the workers.

Design Augmentative, Not Substitutive Systems: Enterprises need to architect digital transformations that function as augmentative (enhancing) tools rather than substitutive (replacing) mechanisms. Companies must position software platforms as blank canvases that help workers realize their innovative ideas, rather than deploying them as algorithmic overseers that rigidly dictate every single operational step.

Integrate Green KPIs into Daily Routines: Acknowledging the robust mediating pathway of task performance, management must integrate Key Performance Indicators (KPIs) related to material efficiency and waste reduction directly into the employees' daily job descriptions. By formally

embedding these metrics, the organization automatically directs worker Innovative Behavior toward executing eco-friendly and sustainable tasks.

Conclusion

This study concludes that individual Innovative Behavior serves as the fundamental cornerstone driving both operational productivity and sustainability initiatives within Bandung's fashion industry sector. Empirical evidence demonstrates that employee innovative ideas significantly elevate task execution and subsequently trigger notable improvements in organizational environmental outcomes. In this context, task performance plays a central mediating role, successfully translating abstract creative concepts into tangible environmental preservation actions within daily operational routines.

Conversely, the most striking finding of this research uncovers a distinct digital transformation paradox. Rather than amplifying outcomes, digital penetration actively functions as a dampening moderator that suppresses the leverage of human Innovative Behavior. Overly rigid algorithmic standardization and hyper-automated systems evidently strip away worker autonomy and severely restrict the employees' discretionary space. Consequently, aggressively adopting technology in operational domains that require cognitive flexibility actively undermines the employees' capacity to optimize task execution and deploy green initiatives. Therefore, fashion industry management must implement digitalization selectively through a human-centric approach, ensuring that technology exists to facilitate human Innovative Behavior rather than replace it.

Acknowledging its limitations, this study primarily confines its geographical scope exclusively to the fashion ecosystem within Bandung City. Furthermore, the research employs a cross-sectional survey design, capturing empirical data at merely a single point in time. This specific methodological constraint restricts the researchers' ability to accurately evaluate the long-term dynamics of how employees adapt to ongoing digitalization.

To address these constraints, future studies should adopt longitudinal

designs to rigorously test the consistency of this digital dampening effect over an extended period. Additionally, upcoming scholars should dissect the specific categories of applied technologies—such as differentiating the structural impacts of administrative software versus artificial intelligence utilized for product design. This granular approach will precisely map which specific digital transformation models inherently stifle Innovative Behavior (substitutive) and which ones successfully amplify human innovation (augmentative).

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References

Akhtar, W. H., Watanabe, C., Tou, Y., & Neittaanmäki, P. (2022). A new perspective on the textile and apparel industry in the digital transformation era. Textiles, 2(4), 633-656.

Ahmed, R. R., Akbar, W., Aijaz, M., Channar, Z. A., Ahmed, F., & Parmar, V. (2023). The role of green innovation on environmental and organizational performance: Moderation of human resource practices and management commitment. Heliyon, 9(1).

Ahsan, M. J. (2025). Green leadership and innovation: catalysts for environmental performance in Italian manufacturing. International Journal of Organizational Analysis, 33(7), 1646-1669.

AlEssa, H. S., & Durugbo, C. M. (2022). Systematic review of innovative work behavior concepts and contributions. Management Review Quarterly, 72(4), 1171-1208.

Bhatti, S. H., Saleem, F., Murtaza, G., & Haq, T. U. (2022). Exploring the impact of green human resource management on environmental performance: the roles of perceived organizational support and innovative environmental behavior. International Journal of Manpower, 43(3), 742-762.

Casciani, D., Chkanikova, O., & Pal, R. (2022). Exploring the nature of digital transformation in the fashion industry: opportunities for supply chains, business models, and sustainability-oriented

innovations. Sustainability: Science, Practice and Policy, 18(1), 773-795.
Colombi, C., & D'Itria, E. (2023). Fashion digital transformation: innovating business models toward circular economy and sustainability. Sustainability, 15(6), 4942.
De Jong, J. P., & Den Hartog, D. N. (2008). Innovative work behavior: Measurement and validation. EIM Business and Policy Research, 8(1), 1-27.
Fromhold-Eisebith, M., Marschall, P., Peters, R., & Thomes, P. (2021). Torn between digitized future and context dependent past–how implementing 'Industry 4.0'production technologies could transform the German textile industry. Technological Forecasting and Social Change, 166, 120620.
Gaglio, C., Kraemer-Mbula, E., & Lorenz, E. (2022). The effects of digital transformation on innovation and productivity: Firm-level evidence of South African manufacturing micro and small enterprises. Technological Forecasting and Social Change, 182, 121785.
Guo, L., & Xu, L. (2021). The effects of digital transformation on firm performance: Evidence from China's manufacturing sector. Sustainability, 13(22), 12844.
Hayes, A. F., & Rockwood, N. J. (2020). Conditional process analysis: Concepts, computation, and advances in the modeling of the contingencies of mechanisms. American behavioral scientist, 64(1), 19-54.
He, Z., Huang, H., Choi, H., & Bilgihan, A. (2023). Building organizational resilience with digital transformation. Journal of service management, 34(1), 147-171.
Hizam, S. M., Akter, H., Sentosa, I., Ahmed, W., Masrek, M. N., & Ali, J. (2023). Predicting workforce engagement towards digital transformation through a multi-analytical approach. Sustainability, 15(8), 6835.
Koopmans, L., Bernaards, C., Hildebrandt, V., Van Buuren, S., Van der Beek, A. J., & De Vet, H. C. (2012). Development of an individual work performance questionnaire. International journal of productivity and performance management, 62(1), 6-28.
Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N., & Roig-Tierno, N. (2021). Digital transformation: An overview of the current state of the art of research. Sage Open, 11(3), 21582440211047576.
Lerman, L. V., Benitez, G. B., Müller, J. M., de Sousa, P. R., & Frank, A. G. (2022). Smart green supply chain management: a configurational

approach to enhance green performance through digital transformation. Supply Chain Management: An International Journal, 27(7), 147-176.

Malik, M., Raziq, M. M., Sarwar, N., & Gohar, M. (2025). Navigating the change: a case study of the textile industry on digital leadership, digital transformation and innovative business models. Benchmarking: An International Journal, 32(2), 550-577.

Matarazzo, M., Penco, L., Profumo, G., & Quaglia, R. (2021). Digital transformation and customer value creation in Made in Italy SMEs: A dynamic capabilities perspective. Journal of Business research, 123, 642-656.

Nasir, A., Zakaria, N., & Zien Yusoff, R. (2022). The influence of transformational leadership on organizational sustainability in the context of industry 4.0: Mediating role of innovative performance. Cogent Business & Management, 9(1), 2105575.

Ogiemwonyi, O., Alam, M. N., & Alotaibi, H. S. (2023). Pathways toward environmental performance: Link between green human resource management, green innovation, and green behavior at work in manufacturing companies. Journal of Cleaner Production, 425, 138949.

Ponis, S. T., & Lada, C. (2021). Digital transformation in the Greek fashion industry: A survey. International Journal of Fashion Design, Technology and Education, 14(2), 162-172.

Prando, L. T., Schmitt, J., Mendonça, A. K. D. S., Rosa, F. S., Lunkes, R. J., Bornia, A. C., & Andrade, D. F. D. (2025). Entrepreneurial potential in digital transformation: scale development using item response theory. European Journal of Innovation Management, 28(7), 2784-2814.

Reis, J., Amorim, M., Melão, N., & Matos, P. (2018). Digital transformation: a literature review and guidelines for future research. In World conference on information systems and technologies (pp. 411-421). Springer, Cham.

Scuotto, V., Arrigo, E., Candelo, E., & Nicotra, M. (2020). Ambidextrous innovation orientation effected by the digital transformation: A quantitative research on fashion SMEs. Business process management journal, 26(5), 1121-1140.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. The journal of strategic information systems, 28(2), 118-144.

Zaoui, F., & Souissi, N. (2020). Roadmap for digital transformation: A literature review. Procedia Computer Science, 175, 621-628.

Conflicts Of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Use Of Artificial Intelligence (AI)

The authors transparently disclose the use of AI Tool exclusively for the purpose of linguistic editing and grammatical refinement of the original draft. The authors maintain full responsibility for the manuscript's substantive content, data integrity, andfinal scientific conclusions.sion to publish the results.

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