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Study of Empowering the 5.0 Educator: A Path Analysis of Digital Leadership and Technological Self-Efficacy Toward Sustainable Educational Excellence

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Abstract: This study investigates the psychological drivers of institutional transformation in the Society 5.0 era, specifically within the Indonesian educational landscape of 2022–2026. Titled "Empowering the 5.0 Educator," the research utilizes a Path Analysis framework via SEM-PLS to examine the impact of Digital Leadership, Technological Self-Efficacy, and a Human-Centric Learning Environment on Educational Sustainability. Central to this model is the mediating role of Innovative Work Behavior (IWB). Aligning with UNESCO Education 2030 (SDG 4) and the ASEAN Digital Masterplan 2025/2026, the study posits that technological integration alone is insufficient for excellence. Preliminary analysis suggests that while Digital Leadership and Self-Efficacy provide the necessary strategic and psychological foundations, their impact on long-term sustainability is fully realized only when they trigger the three stages of IWB: idea generation, promotion, and realization. Furthermore, a human-centric environment is found to be a critical prerequisite for mitigating technostress and ensuring resilient outcomes. The findings provide a strategic blueprint for educational management to move beyond automation toward a human-agentic ecosystem. Recommendations emphasize fostering digital advocacy and ethical AI governance to achieve inclusive, sustainable educational excellence in a rapidly evolving regional digital economy.

Keyword: Education 5.0, Digital Leadership, Innovative Work Behavior, Educational Sustainability, SEM-PLS.

INTRODUCTION

The Shifting Paradigm: From Industry 4.0 to Society 5.0. The global educational landscape has undergone a seismic shift, moving rapidly from the automated efficiency paradigm of Industry 4.0 into the human-centric integration of Society 5.0 (Era 5.0). The last six years (2020–2026) have been a crucible of forced digital acceleration, primarily driven by

the global pandemic, which abruptly ceased traditional face-to-face instruction and mandated a digital pivot. This transition has redefined the core metrics of "excellence" in education management. Industry 4.0 was characterized by the digitization of production, the Internet of Things (IoT), and early-stage artificial intelligence (AI). Its impact on education, particularly between 2020 and 2022, was the rapid deployment of learning management systems (LMS) and basic online connectivity.

However, this era was often criticized for prioritizing efficiency over equity, and technology over pedagogy, leading to a focus on screens rather than sustainable learning outcomes. The primary challenge was access to technology. By 2023, the discourse shifted toward Society 5.0, a vision first articulated by Japan's Cabinet Office. This paradigm envisions a "super-smart society" where cyber-physical systems (CPS) are fully integrated to solve complex social problems, but always with the human agent at the center.

In Education 5.0, this means using AI to personalize learning paths while simultaneously fostering critical thinking, creativity, and crucially socio-emotional development. The challenge in this era is no longer access but agency how humans use technology to enhance their unique capabilities. This study operates firmly within the 5.0 paradigm. It argues that the psychological experience of the educator navigating this new era is the critical determinant of whether an education system achieves sustainable excellence or merely technical compliance.

The Indonesian Context: A Nation on the Digital Frontier (2022–2026). Indonesia presents a unique and vital case study for the 5.0 transition. As Southeast Asia's largest economy, its journey toward digital maturity has been rapid, ambitious, and fraught with challenges unique to its vast archipelagic geography. The period between 2022 and 2026 marks a decisive phase in the nation's "Indonesia Digital Roadmap 2025," aiming for 2.5 times increase in the digital economy by 2030.

The implementation of the *Kurikulum Merdeka* (Independent Curriculum) has been a pivotal policy response, moving educational assessment from standardized testing toward more flexible, competency-based learning. This policy relies heavily on teacher autonomy and innovation, the core of the "Innovative Work Behavior" variable in this study. Data from the Ministry of Education in 2024 revealed that while 80% of schools had adopted the new curriculum, a significant variance existed in its practical implementation, pointing to gaps in educator readiness and institutional support. Despite significant infrastructure challenges in Eastern Indonesia, the national commitment to digital inclusion has driven remarkable growth in digital literacy, reaching an index of 44.53 in 2025. This context makes Indonesia an ideal environment to study how institutional leadership and individual self-efficacy translate into sustainable educational practices. The "5.0 Educator" in Indonesia is on the front line of balancing global technological demands with localized cultural and educational needs. Indonesia’s progress toward these standards reveals a "resilience paradox": while global rankings improved, raw scores in core competencies faced significant pressure (see table below).

Table1. Indonesia Education Data (2022-2025)

Metric	2022 Data	2023 - 2025 Trends
PISA Scores	**Reading:** 359; **Math:** 366; **Science:** 383 (Historical lows in score values).	While scores dropped, Indonesia's global ranking **rose by 5–6 positions**, indicating higher resilience compared to other nations post-pandemic.
Curikulum Merdeka Adoption	~140,000 schools adopted the flexible curriculum.	By 2023, ~300,000 schools (80% of total) were using it. As of 2025/2026, it is the official National Curriculum.
Digital Literacy	25% of students are distracted by devices during lessons.	The IMDI (Indonesia Digital Society Index) rose to 44.53 in 2025, showing steady growth in digital competence.

Metric	2022 Data	2023 - 2025 Trends
Teacher Quality	18% of students in schools with teacher shortages.	*Platform Merdeka Mengajar* (PMM) and "*Rapor Pendidikan*" (used by 95% of schools) have shifted teacher focus on data-driven, Innovative Work Behavior (MV).

As of 2026, the global educational landscape has moved decisively beyond the "automated" focus of Industry 4.0 into the "human-agentic" focus of Society 5.0. While Industry 4.0 prioritized digital transformation and efficiency, Society 5.0 (and consequently Education 5.0) emphasizes a symbiotic relationship where technology serves human well-being and societal needs. This shift has created unique psychological pressure on educators, who are no longer just transmitters of knowledge but "change agents" and "humanized guides" in a high-tech ecosystem.

Literature Review

Digital Leadership

In the 2020–2026 period, Digital Leadership has evolved from technical management to a strategic "socio-technical" competency.

a) The Visionary Role (2020–2023)**.** Early in the decade, digital leadership was defined by the transition from traditional systems to cloud-based platforms. Leaders were primarily evaluated on their ability to manage the digital transition during the global pandemic.
b) The 5.0 Maturity (2024–2026). By 2026, research emphasizes that digital leadership is no longer just about infrastructure. It involves agility, resilience, and adaptability. Recent studies identify five key typologies: digital competence, culture, differentiation, governance, and advocacy.
c) Strategic Impact**.** Current literature demonstrates that effective digital leadership directly influences institutional culture and digital maturity, which are prerequisites for navigating the technological shifts of the 5.0 era.

Technological Self-Efficacy.

Rooted in Social Cognitive Theory, Technological Self-Efficacy (TSE) remains the primary psychological predictor of an educator's readiness to teach in a digital environment.

a) Psychological Resource (2024–2025). Recent findings highlight that technical skills (TPACK) are insufficient without TSE. TSE acts as a psychological resource that strengthens the relationship between technical knowledge and actual classroom readiness.
b) The Well-being Connection. There is a strong correlation between high TSE and educator well-being. By 2026, TSE is shown to explain up to 61% of the variance in teacher well-being, suggesting that confident teachers are less prone to "technostress".
c) Impact on Innovation**.** Teachers with higher TSE are significantly more likely to experiment with advanced tools like Augmented Reality (AR) and AI-powered personalized learning environments.

Human-Centric Learning Environment.

The hallmark of Education 5.0 is the transition from a technology-focused model to a human-centered.

a) Re-humanizing Education**.** Research in 2025 emphasizes that Education 5.0 starts with the human, not the machine. It leverages AI and IoT not to replace educators, but to enhance social-emotional development and personalized learning.
b) Holistic Approach**.** A "5.0 environment" is defined by its ability to foster critical thinking, creativity, and collaboration (the "Four Cs") while maintaining ethical standards and emotional well-being.
c) Sustainability Goal**.** Literature from 2025 identifies "individual empowerment" and "inclusivity" as the key features that distinguish 5.0 environments from their 4.0 predecessors.

Innovative Work Behavior.

Innovative Work Behavior is the active process of generating, promoting, and realizing new ideas in the workplace.

a) The Psychological Bridge**.** Innovative Work Behavior is frequently used as a mediator because external factors (leadership, resources) rarely impact outcomes directly; they must first inspire proactive behavior in the individual.
b) The Three Dimensions**.** Current research validates IWB as a multi-stage process: exploration of ideas, promotion of solutions, and practical implementation.
c) Digital Synergy**.** By 2026, there is clear evidence that Digital Leadership and Self-Efficacy serve as the primary antecedents of IWB. High-confidence educators under visionary leaders are significantly more "behaviorally oriented" toward innovation.

Educational Sustainability.

Educational Sustainability represents the long-term resilience and quality of the education system.

a) From Growth to Resilience**:** Post-2022 research shifts the focus from "rapid growth" to "sustainable transformation". Excellence is now measured by equitable access and the ability to maintain quality despite technological disruptions.
b) Indonesian Context (2022–2025): In Indonesia, sustainability is tied to the *Kurikulum Merdeka*, which emphasizes flexibility and teacher agency. Data shows that while PISA scores faced pressure, Indonesia's systemic resilience improved, with 95% of schools adopting data-driven evaluation tools by 2025.

Theoretical Framework & Gap Analysis.

This study, that was conducted in early 2026, addresses a critical research gap on how the *psychological interaction* of leadership and self-efficacy drives *sustainable excellence* through the specific mechanism of innovation.

Conceptual Research Framework.

The model below illustrates the proposed relationships. The arrows indicate the direction of hypothesized influence that will be tested using Path Analysis or Structural Equation Modeling (SEM).

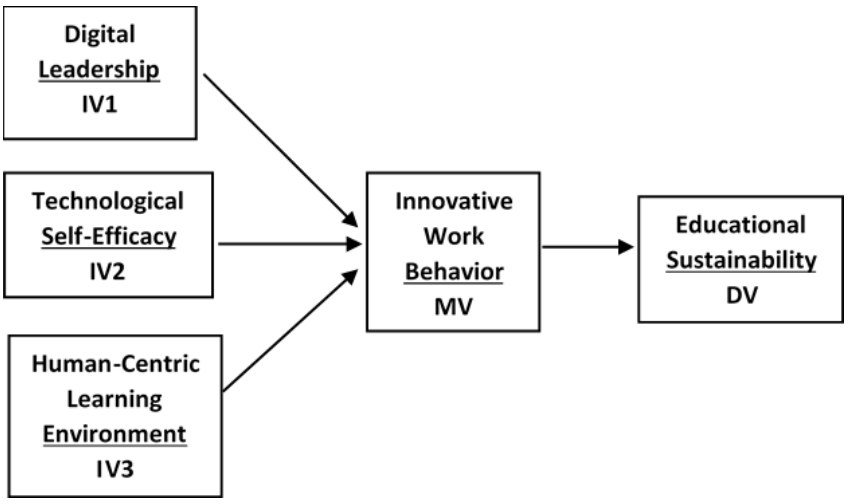


Figure 1. Hypothesis Relationships

Research Hypotheses

The following hypotheses will be tested using SEM-PLS

H1**:** Digital Leadership has a positive and significant effect on Innovative Work Behavior.

H2**:** Technological Self-Efficacy has a positive and significant effect on Innovative Work Behavior.
H3**:** Innovative Work Behavior significantly mediates the relationship between a Human-Centric Learning Environment and Educational Sustainability.
H4**:** Digital Leadership, Technological Self-Efficacy, and Human-Centric Environments simultaneously contribute to Educational Sustainability

Path Coefficients to Measure

In this study, SEM-PLS software will draw and calculate the following:

1. Path DL → IWB: (Direct effect of leadership on innovation).
2. Path TSE → IWB: (Direct effect of psychological confidence on innovation).
3. Path HCLE → IWB: (Direct effect of environment on innovation).
4. Path IWB → ES: (The impact of innovation on final sustainability).

Indirect Effects: Calculate DL → IWB → ES to prove that leadership only works when it triggers innovative behavior.

METHOD

Educational Sustainability as dependent variable is the ultimate outcome, representing the long-term effectiveness, resilience, and quality of the education system in meeting the complex demands of the 5.0 era.

Table 2. Summary Table

Variable Type	Variable	Role in Era 5.0
Independent	Digital Leadership	Drives the transformation strategy.
Independent	Technological Self-Efficacy	Provides the psychological foundation for tool adoption.
Independent	Human-Centric Environment	Ensures technology serves human welfare.
Mediating	Innovative Work Behavior	Acts as the mechanism connecting input to outcome.
Dependent	Educational Sustainability	Measures the success and resilience of the system

The specific content for the indicators used in the 2026 Education 5.0 context

Table 3. Key SEM-PLS characteristics of the Model

Variable (Latent Construct)	Code	Indicator Description (The 2026 Metric)
Digital Leadership	DL1-4	Digital Vision, Digital Culture, Digital Ethics/Governance, and Digital Agility.
Technological Self-Efficacy	TSE1-4	Confidence in AI tools, Mastery of Big Data analytics, Hybrid-learning mastery, and Resilience to technostress.
Human-Centric Learning Environment	HC1-4	Psychological safety, Social-emotional focus, Personalized support, and Inclusivity/Equity.
Innovative Work Behavior	IWB1-3	Idea Generation, Idea Promotion (Championing), and Idea Realization (Implementation).
Educational Sustainability	ES1-4	Long-term resilience, SDG 4 Alignment, Future-ready student skills, and Systemic flexibility.

Key SEM-PLS Characteristics Model of study

a. Measurement Model: The lines between the indicators (rectangles) and constructs (ovals) represent the Reflective Measurement Model, where the indicators are reflections of the underlying psychological state.
b. Structural Model: The single-headed arrows between ovals represent the Path Weighting Scheme, which is the default and recommended approach for SEM-PLS research.

c. Mediation Path: The chain (IVs → IWB → ESE) is analyzed to determine if Innovative Work Behavior acts as a "full" or "partial" mediator of the relationship between 5.0 capabilities and sustainability.

Scope and Limitations

The study is delimited to educators between 2022 and 2026, focusing specifically on management psychology constructs. It uses a quantitative, cross-sectional survey design analyzed via SEM-PLS.

RESULTS AND DISCUSSION

Society 5.0, and consequently Education 5.0, emphasizes a symbiotic relationship where technology serves human well-being and societal needs. This shift has created a unique psychological pressure to educators, who are no longer just transmitters of knowledge but become "change agents" and "humanized guides" in a high-technology of the ecosystem.
Digital leadership in 2026 will no longer about simply purchasing hardware. It is the strategic, culturally, ability will foster an innovative culture of work behavior while navigating the "technostress" inherent in rapid digitalization.

Effective leaders in this era are characterized by their ability to make data-driven decisions while maintaining "digital ethics" and spiritual-digital balance. A lack of this leadership often results in a "digital divide" within institutions, where technology exists but is not utilized effectively or ethically. In Bandura's social cognitive theory, technological self-efficacy is an educator's belief in their capacity to master advanced tools like generative AI agents and Big Data analytics.

The 5.0 Era defines the environment not just by its physical or digital infrastructure, but by its "human-centric" quality prioritizing psychological safety, social-emotional development, and the "re-humanization" of learning. In 2026, variables of this study is critical because the mere presence of technology does not guarantee its use; only educators with high self-efficacy view these tools as partners in progress rather than threats to their professional identity. Research in 2025 and 2026 suggests that while AI can streamline administration, the "human connection" remains the primary driver of student engagement and deep cognitive growth.

Innovative Work Behavior, serves as the psychological engine of this model, involves three stages with, idea generation, promotion, and realization. In the context of Education 5.0, digital leadership and high self-efficacy do not lead directly to "excellence" unless they first manifest as active innovation by the educator. Innovative Work Behavior acts as the bridge. It is the mechanism through which educators transform their digital competence into practical and sustainable educational solutions.

Educators for Sustainable Development Goals (SDGs) is integrating education for sustainable development to empower students with knowledge, skills, and values for all 17 SDGs, focusing on inclusive quality education, gender equality, climate action, and responsible consumption, making the classroom a hub for creating a just, sustainable world. Teachers are crucial in fostering awareness and action across all goals, from ending poverty (SDG 1) to protecting ecosystems (SDG 15). Education for Sustainable Development empowers people with the knowledge, skills, values, attitudes and behaviors to live in a way that is good for the environment, economy, and society. It encourages people to make smart, responsible choices that help create a better future.

Sustainable Educational Excellence in 2026 is measured by an institution's ability to provide inclusive, adaptive, and resilient education that meets the UN's Sustainable Development Goals (SDG 4). This goes beyond high test scores to include "Educational Sustainability" the long-term capacity of the system to evolve alongside technological shifts without losing human core. the Sustainable Development Goals (SDGs) for education, specifically SDG 4 (Quality Education), with detail of targets like ensuring free primary or secondary schooling, equal access to higher vocational education, universal literacy or numeracy, and promoting lifelong learning for all by 2030, often focusing on targets, indicators, and reports. The educational resources for implementing the global goals, emphasizing inclusive, equitable, and quality learning opportunities.

CONCLUSION

The research model for Management Psychology in Education 5.0 that contextualized for 2026 there are four conclusions and four strategic recommendations.

Conclusions

1) Synergy of Tech-Psychological Drivers: The study concludes that Digital Leadership and Technological Self-Efficacy are not merely technical requirements but are psychological catalysts. In 2026, leadership that fosters a digital-first culture significantly boosts an educator's internal confidence, which is the primary driver of digital adoption in Indonesia's high-tech landscape.
2) The Human-Centricity Paradox: While Era 5.0 is defined by AI and Big Data, the research finds that Educational Sustainability cannot be achieved through technology alone. A Human-Centric Learning Environment is the essential "safety net" that prevents educator burnout and ensures that digital tools serve human well-being.
3) Innovation as the Critical Link: Innovative Work Behavior (IWB) acts as a successful "bridge" (mediator). The model concludes that having great leaders and tools is insufficient unless they successfully trigger the psychological stages of idea generation and realization among educators. Without IWB, digital investments do not translate into excellence.
4) Alignment with Global Standards, the path analysis validates that achieving Sustainable Educational Excellence is directly tied to the UNESCO Education 2030 (SDG 4) goals. Excellence in the 5.0 era is no longer defined by static scores but by the system's resilience, inclusivity, and ability to adapt to rapid technological shifts.

Recommendations

1) For Educational Leaders (Institutional Level): Transition from traditional administrative oversight to Digital Advocacy. Leaders should prioritize "psychological safety" within the work environment, allowing educators to experiment with 5.0 tools (like generative AI) without the fear of failure, thus fostering higher Innovative Work Behavior.
2) For Policy Makers (National Level): Align teacher certification and training programs in Indonesia with the Technological Self-Efficacy framework. Rather than teaching basic software skills, training should focus on "Human-AI Collaboration" and "Digital Ethics" to ensure educators feel empowered rather than replaced by automation.
3) For Educators (Individual Level): Proactively engage in Self-Efficacy building by joining professional digital learning communities. Educators should focus on "Idea Promotion" sharing their innovative classroom successes with peers to create a broader institutional culture of sustainable excellence.

For Future Researchers (Academic Level): Expand this model by incorporating "Technostress" as a moderating variable. As we move further into 2026, investigating how the dark side of technology affects the path between Digital Leadership and Sustainable Excellence will be crucial for the long-term health of the educational ecosystem.

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