

# **DIGITAL TRANSFORMATION, HUMAN COMPETENCY, AND SUSTAINABLE VALUE CREATION IN THE SPORT INDUSTRY: AN INTEGRATIVE FRAMEWORK FROM EDUCATION TO NATIONAL ECONOMIC IMPACT**

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## **Abstract**

Digital transformation has become a critical driver reshaping the sport industry by influencing human competency development, education, wellness, and sustainability. This study examines how digital transformation in sport contributes to sustainable value creation through the mediating roles of human competency and sustainability-oriented practices. Using a quantitative research design, data were collected from 412 stakeholders within the Thai sport ecosystem, including sport managers, educators, entrepreneurs, and fitness professionals. Structural equation modeling was employed to test the proposed hypothesized model.

The results indicate that digital transformation has a significant positive effect on human competency and sustainable sport business practices. Human competency, in turn, significantly enhances education and research capability as well as wellness outcomes, while sustainable practices contribute positively to national economic and social value creation. Mediation analysis further reveals that human competency and sustainability act as key mechanisms through which digital transformation generates broader societal impact.

The study contributes theoretically by integrating digital transformation and human competency perspectives within a multi-level sport development framework. Practically, the findings highlight the importance of aligning digital investment with human capital development and sustainability strategies. The results offer valuable implications for sport education institutions, sport organizations, and policymakers seeking to leverage digital transformation to promote education, wellness, and sustainable national development.

**Keywords:** Digital transformation, human competency, sport education, wellness, sustainability, structural equation modeling

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## Introduction

Digital transformation has become a pivotal force reshaping the global sport industry, extending far beyond technological adoption to influence human competency development, education systems, wellness outcomes, and sustainability agendas (Kittikumpanat et al., 2023). Advances in digital platforms, data analytics, and artificial intelligence (AI) have altered how sport organizations operate, how athletes and professionals develop competencies, and how sport contributes to broader economic and social value creation (Gerke et al., 2024; Xu & Baghaei, 2025). As sport increasingly intersects with national development strategies, the role of digitally enabled human capital has emerged as a critical determinant of long-term competitiveness and sustainability (Chankuna, 2025).

Prior research has demonstrated that sport success and performance excellence can generate measurable economic returns at the national level through tourism, branding, and investment attraction. For example, international sporting achievements have been shown to stimulate income generation and enhance national visibility, positioning sport as a strategic economic asset rather than a purely recreational activity (Chankuna, 2025). At the organizational level, digital tools have been employed to enhance efficiency and benchmarking, particularly within fitness and sport service businesses, thereby supporting improved service quality and wellness outcomes (Chankuna et al., 2023). These findings suggest that digital transformation plays a foundational role in translating sport performance into sustainable economic and social benefits.

In parallel, human competency has gained prominence as a central mechanism through which digital transformation delivers value in the sport sector. Evidence from sport entrepreneurship research indicates that digital awareness, adaptive learning, and entrepreneurial mindset are essential competencies enabling sport professionals to identify opportunities and sustain competitive advantage in rapidly changing markets (Chankuna et al., 2024). Sport education institutions, particularly specialized universities, therefore face increasing pressure to align curricula and research agendas with digital and sustainability-driven competencies that extend beyond traditional technical or physical training.

From a sustainability perspective, recent studies highlight the growing importance of digitally supported circular business models and climate-adaptive strategies within the sport industry. Circular sport business models emphasize sustainable value co-creation by integrating economic, environmental, and social objectives, while digital innovation facilitates measurement, coordination, and long-term impact assessment (Gerke et al., 2024). Moreover, climate adaptation research underscores the necessity of digital solutions in managing environmental risks and ensuring resilience in sport performance, management, and policy (Kobkarn et al., 2025). These developments further reinforce the interdependence between digital transformation, human competency, and sustainable sport systems.

Despite these advances, the existing literature remains fragmented. Studies tend to examine digital transformation, human competency, wellness, or sustainability in isolation, offering limited insight into how these dimensions interact across individual, organizational, and national levels. Moreover, while artificial intelligence and advanced analytics are increasingly recognized as transformative forces in sport performance and fan engagement (Xu & Baghaei, 2025), their broader implications for education, wellness, and sustainable value creation have not yet been fully integrated into a unified analytical framework.

To address this gap, the present study seeks to develop and empirically examine an integrative framework that explains how digital transformation in sport influences human competency development and, in turn, contributes to education and research capability, wellness outcomes, sustainable business practices, and national economic and social value creation. Guided by this objective, the study is structured around the following research questions: (1) How does digital transformation influence human competency development in the sport industry? (RQ1) (2) How does human competency affect sport education and research capability? (RQ2) (3) What is the relationship

between human competency and wellness outcomes in sport organizations? (RQ3) (4) How does digital transformation contribute to sustainable sport business practices? (RQ4) (5) How do sustainability-oriented sport practices contribute to national economic and social value creation? (RQ5) and (6) How can the relationships among digital transformation, human competency, wellness, sustainability, and value creation be explained through an integrative framework? (RQ6)

By addressing these six questions, this study contributes to sport management and sport science literature in three ways. First, it advances theoretical understanding by integrating digital transformation and human competency perspectives within a multi-level sport development framework. Second, it provides empirical evidence to support curriculum design, research planning, and wellness-oriented management in sport education institutions. Third, it offers policy-relevant insights into how digitally enabled sport ecosystems can contribute to sustainable national development in an increasingly competitive global environment.

### **Research Objectives**

1. To investigate the influence of digital transformation on human competency development in the sport sector (RO1).
2. To examine the effect of human competency on sport education and research capability (RO2).
3. To analyze the relationship between human competency and wellness outcomes in sport organizations (RO3).
4. To examine the impact of digital transformation on sustainable sport business practices (RO4).
5. To assess the contribution of sustainability-oriented sport practices to national economic and social value creation (RO5).
6. To develop and validate an integrative framework explaining the global impact of digital transformation in sport (RO6).

### **Hypothesis**

*H1:* Digital transformation has a positive and significant effect on human competency development in the sport industry.

*H2:* Human competency has a positive and significant effect on sport education and research capability.

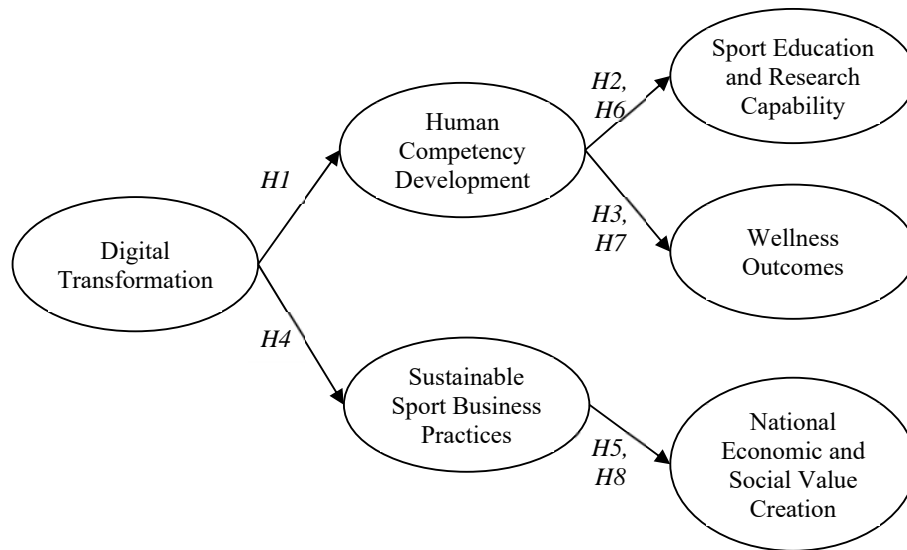
*H3:* Human competency has a positive and significant effect on wellness outcomes in sport organizations.

*H4:* Digital transformation has a positive and significant effect on sustainable sport business practices.

*H5:* Sustainable sport business practices have a positive and significant effect on national economic and social value creation.

*H6–H8:* Human competency and sustainable sport practices mediate the relationships between digital transformation, wellness, education, and national value creation.

The proposed hypothesized model is illustrated in Figure 1.



**Figure 1** The hypothesized model.

## Research Methods

### Research Design

This study employed a quantitative research design using a cross-sectional survey approach to empirically test the proposed hypothesized model examining the relationships among digital transformation, human competency, education and research capability, wellness outcomes, sustainable sport business practices, and national economic and social value creation. This approach was appropriate for validating causal relationships and assessing the overall fit of an integrative framework.

### Population and Sample

The target population comprised stakeholders within the Thai sport ecosystem, including sport managers, sport educators, sport entrepreneurs, fitness center operators, and sport-related professionals. Due to limitations in existing databases, the exact size of the target population could not be precisely determined (Chankuna, 2024). Consequently, sample size determination was guided by methodological requirements for structural equation modeling (SEM).

Following SEM recommendations, the minimum sample size was calculated based on the ratio of cases to observed indicators. With 36 observed indicators included in the model, a minimum of 360–720 respondents were recommended, applying a ratio of 10:1 to 20:1 (Hair et al., 2020). To ensure adequate statistical power and model stability, data were collected from 412 respondents, exceeding the minimum requirement. A purposive sampling technique was employed to recruit participants with direct experience in digital transformation, management, education, or sustainability within the sport sector.

### Research Instrument

Data were collected using a structured questionnaire developed from an extensive review of relevant literature. The questionnaire consisted of 36 indicators representing six latent constructs: (1) Digital Transformation (6 indicators) (2) Human Competency Development (7 indicators) (3) Education and Research Capability (5 indicators) (4) Wellness Outcomes (5 indicators) (5) Sustainable Sport Business Practices (7 indicators) and (6) National Economic and Social Value Creation (6 indicators). All items were measured using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

### **Validity and Reliability**

Prior to data collection, the questionnaire was assessed for content validity by a panel of five experts in sport management, digital transformation, and research methodology. Each item was evaluated for relevance and clarity using a four-level scale. The average item-content validity index (I-CVI) was 0.91, exceeding the recommended threshold (Ayre & Scally, 2014). Minor revisions were made based on expert feedback.

A pilot study was subsequently conducted with 40 sport professionals. Reliability analysis demonstrated satisfactory internal consistency, with Cronbach's alpha coefficients ranging from 0.82 to 0.90, meeting acceptable criteria (Taber, 2018).

### **Data Collection**

The finalized questionnaire was administered via an online survey platform (Google Forms). The survey link was distributed through professional networks, institutional mailing lists, and sport-related academic and industry events. Participation was voluntary, and informed consent was obtained from all respondents prior to completing the questionnaire. A total of 438 responses were received, of which 412 valid questionnaires were retained after data screening.

### **Data Analysis**

Data analysis was conducted using Structural Equation Modeling (SEM) following a two-stage procedure. First, confirmatory factor analysis (CFA) was performed to evaluate the measurement model, including factor loadings, composite reliability, and average variance extracted (AVE). Second, structural path analysis was conducted to test the hypothesized relationships among constructs. Model fit was assessed using multiple indices, including chi-square ( $\chi^2$ ), comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR), in accordance with recommended cutoff criteria (Hu & Bentler, 1999; Kline, 2023).

### **Ethical Considerations**

Ethical principles for research involving human participants were strictly observed. All respondents were informed of the study objectives, assured of confidentiality and anonymity, and informed of their right to withdraw at any stage without consequence. No personally identifiable information was collected.

## **Research Results**

### **Descriptive Statistics**

A total of 412 valid responses were obtained from stakeholders within the Thai sport ecosystem, including sport managers, sport educators and researchers, sport entrepreneurs, fitness center operators, and sport-related professionals. Most respondents held managerial or decision-making positions within their organizations. The majority (64.1%) reported more than five years of professional experience in the sport sector, while 69.7% indicated prior involvement in digital transformation, innovation, or sustainability-related initiatives. This profile reflects a well-experienced and digitally engaged sample, consistent with the objectives of the study.

Descriptive analysis indicated that all six constructs demonstrated high to very high mean levels. Digital Transformation (DT) showed a high perception level ( $M = 4.26$ ,  $SD = 0.47$ ), followed by Human Competency Development (HCD) ( $M = 4.31$ ,  $SD = 0.44$ ). Sport Education and Research Capability (SERC) was also rated highly ( $M = 4.18$ ,  $SD = 0.49$ ), while Wellness Outcomes (WO) exhibited a high mean level ( $M = 4.22$ ,  $SD = 0.46$ ). Sustainable Sport Business Practices (SUST) recorded a high perception level ( $M = 4.29$ ,  $SD = 0.45$ ), and National Economic and Social Value Creation (NESVC) showed the highest mean score ( $M = 4.34$ ,  $SD = 0.43$ ).

These findings address RQ1–RQ3 and RO1–RO3, indicating that sport stakeholders perceive digital transformation and human competency as central drivers of education, wellness, and sustainability within the sport industry.

### Measurement Model (Confirmatory Factor Analysis Results)

Confirmatory factor analysis (CFA) was conducted to assess the validity and reliability of the 36 observed indicators representing six latent constructs. All standardized factor loadings and Cronbach's Alpha exceeded the recommended threshold of 0.60, indicating satisfactory indicator reliability.

Composite reliability (CR) values ranged from 0.84 to 0.92, while average variance extracted (AVE) values ranged from 0.56 to 0.73, confirming adequate convergent validity. Discriminant validity was established as the square root of AVE for each construct exceeded the inter-construct correlations.

The measurement model demonstrated a good fit with the empirical data ( $\chi^2/df = 2.11$ , CFI = 0.94, TLI = 0.93, RMSEA = 0.052, SRMR = 0.046), indicating that the observed variables reliably represented their respective latent constructs. Table 1 presents the detailed results of validity and reliability analysis.

**Table 1** Results of validity and reliability analysis

| Factors  | Item   | Factor Loading (>0.60) | Cronbach's Alpha (>0.7) | CR (0.84 to 0.92) | AVE (0.56 to 0.73) |
|--|--------|------------------------|-------------------------|-------------------|--------------------|
| 1. Digital Transformation (DT)                         | DT1    | 0.83                   | 0.915                   | 0.92              | 0.73               |
|  | DT2    | 0.76                   |                         |                   |                    |
|  | DT3    | 0.85                   |                         |                   |                    |
|  | DT4    | 0.71                   |                         |                   |                    |
|  | DT5    | 0.75                   |                         |                   |                    |
|  | DT6    | 0.81                   |                         |                   |                    |
| 2. Human Competency Development (HCD)                  | HCD1   | 0.76                   | 0.858                   | 0.87              | 0.69               |
|  | HCD2   | 0.81                   |                         |                   |                    |
|  | HCD3   | 0.84                   |                         |                   |                    |
|  | HCD4   | 0.78                   |                         |                   |                    |
|  | HCD5   | 0.81                   |                         |                   |                    |
|  | HCD6   | 0.79                   |                         |                   |                    |
|  | HCD7   | 0.85                   |                         |                   |                    |
| 3. Sport Education and Research Capability (SERC)      | SERC1  | 0.88                   | 0.896                   | 0.91              | 0.74               |
|  | SERC2  | 0.79                   |                         |                   |                    |
|  | SERC3  | 0.75                   |                         |                   |                    |
|  | SERC4  | 0.83                   |                         |                   |                    |
|  | SERC5  | 0.87                   |                         |                   |                    |
| 4. Wellness Outcomes (WO)                              | WO1    | 0.77                   | 0.897                   | 0.89              | 0.75               |
|  | WO2    | 0.85                   |                         |                   |                    |
|  | WO3    | 0.89                   |                         |                   |                    |
|  | WO4    | 0.85                   |                         |                   |                    |
|  | WO5    | 0.87                   |                         |                   |                    |
| 5. Sustainable Sport Business Practices (SUST)         | SUST1  | 0.79                   | 0.844                   | 0.84              | 0.56               |
|  | SUST2  | 0.81                   |                         |                   |                    |
|  | SUST3  | 0.83                   |                         |                   |                    |
|  | SUST4  | 0.76                   |                         |                   |                    |
|  | SUST5  | 0.82                   |                         |                   |                    |
|  | SUST6  | 0.77                   |                         |                   |                    |
|  | SUST7  | 0.83                   |                         |                   |                    |
| 6. National Economic and Social Value Creation (NESVC) | NESVC1 | 0.76                   | 0.832                   | 0.83              | 0.53               |
|  | NESVC2 | 0.82                   |                         |                   |                    |
|  | NESVC3 | 0.85                   |                         |                   |                    |
|  | NESVC4 | 0.83                   |                         |                   |                    |
|  | NESVC5 | 0.81                   |                         |                   |                    |
|  | NESVC6 | 0.73                   |                         |                   |                    |

### Structural Model (Structural Equation Modeling Results)

Prior to structural equation modeling (SEM) analysis, assumptions of multivariate normality and multicollinearity were examined. All observed indicators demonstrated acceptable skewness and kurtosis values within  $\pm 2$ , indicating normal distribution. Inter-construct correlation coefficients ranged from 0.58 to 0.71, suggesting no multicollinearity concerns (Kline, 2023).

SEM analysis revealed that the proposed hypothesized model exhibited a good fit without requiring model respecification. The structural model fit indices were within acceptable thresholds ( $\chi^2/df = 2.24$ , CFI = 0.93, TLI = 0.92, RMSEA = 0.055, SRMR = 0.049), confirming consistency between the theoretical model and empirical data.

The results indicated that digital transformation had a significant positive effect on human competency, which in turn significantly influenced education and research capability and wellness outcomes. Additionally, digital transformation significantly affected sustainable sport business practices, which subsequently contributed to national economic and social value creation. All hypothesized relationships (H1–H8) were supported at  $p < 0.001$ . Table 2 presents the standardized path coefficients of the structural model, while Table 3 summarizes the results of hypothesis testing. The validated structural model representing the Digital Transformation–Human Competency–Sustainability framework is illustrated in Figure 2.

**Table 2** Results of measurement equations for the model

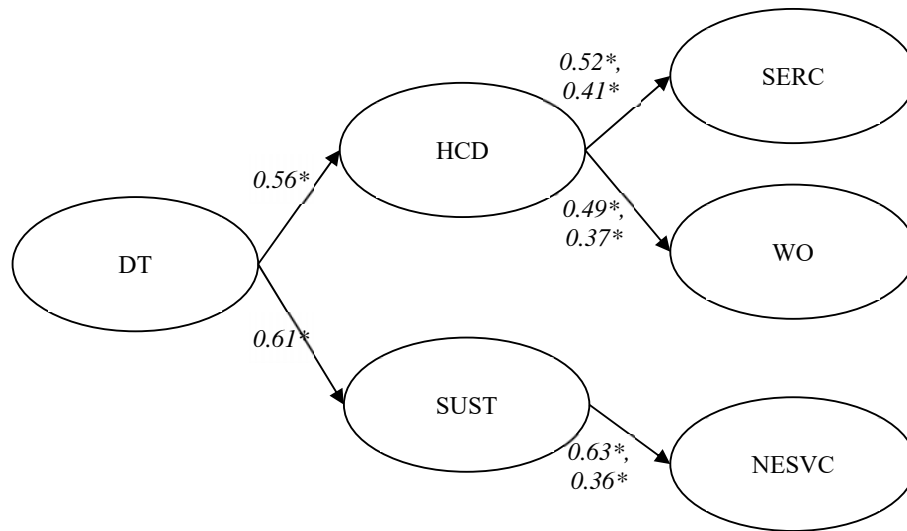
| Latent Factors and Paths | Estimate Standardized Factor Loading ( $\lambda$ ) | <i>t</i> | Standard Error (S.E.) | <i>R</i> <sup>2</sup> |
|--------------------------|--|----------|-----------------------|-----------------------|
| HCD                      |  |          |                       |                       |
| DT                       | 0.56   | 33.44*   | 0.032                 | 0.53                  |
| SUST                     |  |          |                       |                       |
| DT                       | 0.61   | 36.54*   | 0.023                 | 0.62                  |
| SERC                     |  |          |                       |                       |
| HCD                      | 0.52   | 32.51*   | 0.034                 | 0.46                  |
| WO                       |  |          |                       |                       |
| HCD                      | 0.49   | 31.78*   | 0.036                 | 0.44                  |
| NESVC                    |  |          |                       |                       |
| SUST                     | 0.63   | 37.66*   | 0.020                 | 0.67                  |

\* $p < 0.001$

**Table 3** Hypotheses summarized

| Hypothesis | Path         | Estimate Standardized Factor Loading ( $\lambda$ ) | Result    |
|------------|--------------|--|-----------|
| H1         | DT → HCD     | 0.56*  | Supported |
| H2         | HCD → SERC   | 0.52*  | Supported |
| H3         | HCD → WO     | 0.49*  | Supported |
| H4         | DT → SUST    | 0.61*  | Supported |
| H5         | SUST → NESVC | 0.63*  | Supported |
| H6         | DT → SERC    | Indirect effect = 0.41*                            | Supported |
| H7         | DT → WO      | Indirect effect = 0.37*                            | Supported |
| H8         | DT → NESVC   | Indirect effect = 0.36*                            | Supported |

\* $p < 0.001$



\*p < 0.001

**Figure 2** The validated structural model.

### Summary of Results

Overall, the findings provide strong empirical support for the proposed hypothesized model. Digital transformation emerged as a foundational driver influencing human competency and sustainable practices, which subsequently enhance education and research capability, wellness outcomes, and national economic and social value creation in the sport industry

### Conclusion and Discussion

This study examined the global impact of digital transformation in the sport industry through the lens of human competency, education, wellness, sustainability, and national value creation. Drawing on empirical evidence from stakeholders within the Thai sport ecosystem, the study developed and validated an integrative framework explaining how digital transformation generates value across individual, organizational, and national levels.

The findings confirm that digital transformation is a critical driver of human competency development, which in turn enhances education and research capability and wellness outcomes. Furthermore, digital transformation supports sustainable sport business practices, which contribute significantly to national economic and social value creation. The mediation effects highlight human competency and sustainability as essential mechanisms through which digital transformation achieves its broader impact. The discussion is structured in alignment with the research questions, objectives, and hypotheses.

#### Digital Transformation and Human Competency Development (RQ1, RO1, H1)

The findings indicate that digital transformation has a strong and positive effect on human competency development in the sport sector, thereby supporting H1. This result addresses RQ1 and fulfills RO1, confirming that digital technologies—such as data analytics, digital platforms, and AI-enabled systems—serve as critical enablers of skill development, adaptive learning, and problem-solving capacity among sport professionals.

This finding is consistent with previous research emphasizing the role of digital readiness and entrepreneurial mindset in enhancing competitiveness within sport-related enterprises (Chankuna et al., 2024). Moreover, the result extends prior efficiency and benchmarking studies (Chankuna et al., 2023) by demonstrating that digital transformation influences not only operational performance but also the underlying human competencies that sustain long-term organizational success.

### **Human Competency, Education, and Research Capability (RQ2, RO2, H2)**

The results show that human competency significantly influences education and research capability, thereby supporting H2 and addressing RQ2 and RO2. This indicates that digitally competent human capital enhances curriculum innovation, research productivity, and the effective integration of digital tools within sport education institutions.

This finding reinforces the role of sport universities as strategic hubs for digital knowledge creation and dissemination. It also aligns with digital maturity frameworks in sport media and education, which emphasize the importance of competency-driven transformation rather than technology adoption alone (Kittikumpanat et al., 2023). The results suggest that investment in human competency is essential for sustaining research excellence and educational relevance in the digital era.

### **Human Competency and Wellness Outcomes (RQ3, RO3, H3)**

The significant positive relationship between human competency and wellness outcomes supports H3 and responds to RQ3 and RO3. Digitally skilled professionals are better equipped to design, deliver, and manage wellness-oriented sport services, including personalized training, health monitoring, and organizational well-being initiatives.

This finding extends previous research on fitness center efficiency and service quality (Chankuna et al., 2023) by linking human competency directly to wellness outcomes. It suggests that digital transformation contributes indirectly to wellness by enhancing the capabilities of those responsible for service delivery and management.

### **Digital Transformation and Sustainable Sport Business Practices (RQ4, RO4, H4)**

The results indicate that digital transformation has a significant positive effect on sustainable sport business practices, supporting H4 and addressing RQ4 and RO4. Digital technologies facilitate data-driven resource management, environmental monitoring, and circular value creation, thereby enabling sport organizations to align economic performance with sustainability objectives.

This finding aligns with the typology of circular sport business models proposed by Gerke et al. (2024) and supports climate adaptation strategies emphasizing innovation-driven sustainability in sport management and policy (Kobkarn et al., 2025). Digital transformation thus emerges as a foundational mechanism for operationalizing sustainability in the sport industry.

### **Sustainability and National Economic and Social Value Creation (RQ5, RO5, H5)**

The positive relationship between sustainable sport business practices and national economic and social value creation confirms H5, addressing RQ5 and RO5. This result suggests that sustainability-oriented sport practices contribute not only to organizational resilience but also to broader economic and societal outcomes, including income generation, social well-being, and national development.

This finding extends prior evidence demonstrating how sport success and innovation can translate into national income and policy relevance (Chankuna, 2025). It highlights sustainability as a strategic pathway through which sport can generate long-term national value rather than short-term economic gains alone.

### **Mediation Effects of Human Competency and Sustainability (RQ6, RO6, H6–H8)**

The mediation analysis revealed that human competency and sustainable sport business practices act as key transmission mechanisms linking digital transformation to education, wellness, and national value creation. The support for H6–H8 addresses RQ6 and fulfills RO6, validating the proposed integrative framework.

These findings demonstrate that digital transformation does not directly produce outcomes in isolation; rather, its impact is realized through the development of human competency and the adoption of sustainability-oriented practices (Kittikumpanat et al, 2023; Xu & Baghaei, 2025). This insight contributes to theory by integrating digital transformation and human capital perspectives within a multi-level sport development framework.

### **Limitations and Future Research**

Despite its contributions, this study has several limitations that should be acknowledged. First, the use of a cross-sectional research design limits the ability to infer causality among the examined constructs. Longitudinal studies may provide deeper insight into how digital transformation and human competency evolve over time within sport systems.

Second, the study focused on stakeholders within the Thai sport ecosystem, which may limit the generalizability of the findings. Future research could employ comparative or cross-national designs to examine variations in digital transformation and competency development across different institutional and cultural contexts.

Future studies may adopt mixed-method or qualitative approaches to explore how specific digital technologies—such as artificial intelligence, wearable technologies, or data platforms—shape human competency and sustainability practices in greater depth.

In conclusion, this study underscores the importance of aligning digital transformation with human competency development and sustainability to ensure that sport contributes meaningfully to education, wellness, and national development in the digital era.

### **Suggestions**

Based on the empirical findings and the validated hypothesized model, several suggestions are proposed for advancing digital transformation, human competency development, and sustainable value creation in the sport sector.

#### **Suggestions for Sport Education Institutions**

Sport universities and higher education institutions should prioritize the integration of digital competency, data analytics, artificial intelligence, and sustainability-oriented thinking into sport management and sport science curricula. The findings suggest that human competency serves as a key mechanism through which digital transformation translates into educational excellence and wellness outcomes. Therefore, curriculum design should move beyond technical sport skills toward interdisciplinary learning that combines technology, entrepreneurship, and sustainability.

In addition, universities should encourage practice-based and industry-linked research to enhance education and research capability. Collaborative research platforms involving sport organizations, technology providers, and policymakers may further strengthen the role of universities as drivers of digital sport ecosystems.

#### **Suggestions for Sport Organizations and Industry Practitioners**

Sport organizations are encouraged to view digital transformation as a human-centered process, rather than a purely technological investment. The results indicate that digital tools yield meaningful outcomes only when accompanied by systematic human competency development. Continuous professional development programs focusing on digital literacy, adaptive management, and sustainability practices are therefore recommended.

Furthermore, sport enterprises should adopt sustainable and circular business practices supported by digital systems for monitoring performance, resource efficiency, and environmental impact. Such practices not only improve organizational resilience but also contribute to broader economic and social value creation.

#### **Suggestions for Policymakers**

From a policy perspective, sport should be recognized as a strategic sector for digital and sustainable national development. Policymakers may consider integrating sport into national digital economy and sustainability frameworks, such as innovation-driven growth and climate adaptation strategies. Investment in digital sport infrastructure, data platforms, and human capital development can amplify the societal returns of sport beyond competition outcomes.

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