

## **Enhancing Academic Performance through Digital Capability and Digital Citizenship: Evidence from Business Administration Students**

**Nanang Adie Setyawan<sup>1</sup>, Andi Setiawan<sup>2</sup>, Suwardi<sup>3</sup>, Saptianing<sup>4</sup>, Destine Fajar Wiedayanti<sup>5</sup>, Dheanda Maurizta Chairunnisa<sup>6</sup>**

Department of Business Administration, Politeknik Negeri Semarang, Indonesia

Email: [nanangadie@polines.ac.id](mailto:nanangadie@polines.ac.id)

### **ABSTRACT**

*The rapid digital transformation of higher education has reshaped learning processes, academic engagement, and student performance. Universities are increasingly required to ensure that students not only possess technical digital skills but also demonstrate responsible and ethical behavior in digital environments. This study aims to examine the influence of digital capability and digital citizenship on academic performance among Business Administration students. A quantitative, causal research design was employed using a cross-sectional survey approach. Data were collected from 120 final-year students of the Business Administration Department at Politeknik Negeri Semarang through a structured questionnaire measured on a five-point Likert scale. Structural Equation Modeling (SEM) with AMOS was utilized to test the proposed model and hypotheses. The results indicate that digital capability has a positive and significant effect on academic performance, while digital citizenship also exerts a positive and significant influence on students' academic outcomes. The structural model demonstrates good overall fit, and the explanatory power shows that a substantial proportion of variance in academic performance is jointly explained by digital capability and digital citizenship. These findings contribute to the literature by integrating digital competence and ethical digital behavior within a single explanatory framework of academic performance. Practically, the study provides insights for higher education institutions in designing digital learning strategies that enhance both technical capability and responsible digital engagement to improve students' academic achievement.*

**Keywords:** *Digital Capability; Digital Citizenship; Academic Performance; Higher Education; Structural Equation Modeling*

**Meningkatkan Prestasi Akademik melalui Kemampuan Digital dan Kewarganegaraan Digital: Bukti dari Mahasiswa Administrasi Bisnis**

### **Abstrak**

Transformasi digital yang pesat dalam pendidikan tinggi telah mengubah secara signifikan proses pembelajaran, keterlibatan akademik, dan kinerja mahasiswa. Perguruan tinggi semakin dituntut untuk memastikan bahwa mahasiswa tidak hanya memiliki keterampilan teknis digital, tetapi juga menunjukkan perilaku yang bertanggung jawab dan beretika dalam lingkungan digital. Penelitian ini bertujuan untuk mengkaji pengaruh digital capability dan digital citizenship terhadap academic performance mahasiswa Administrasi Bisnis. Penelitian ini menggunakan desain kuantitatif kausal dengan pendekatan survei cross-sectional. Data dikumpulkan dari 120 mahasiswa tingkat akhir Jurusan Administrasi Bisnis di Politeknik Negeri Semarang melalui kuesioner terstruktur dengan skala Likert lima poin. Teknik analisis yang digunakan adalah Structural Equation Modeling (SEM) dengan bantuan perangkat lunak AMOS untuk menguji model dan hipotesis penelitian. Hasil penelitian menunjukkan bahwa digital capability berpengaruh positif dan signifikan terhadap academic performance mahasiswa. Selain itu, digital citizenship juga memiliki pengaruh positif dan signifikan terhadap capaian akademik mahasiswa. Model struktural

yang diusulkan menunjukkan tingkat kesesuaian yang baik, dengan daya jelaskan yang memperlihatkan bahwa proporsi variasi academic performance yang cukup besar dapat dijelaskan secara simultan oleh digital capability dan digital citizenship. Temuan ini memberikan kontribusi terhadap pengembangan literatur dengan mengintegrasikan kompetensi digital dan perilaku etis dalam penggunaan teknologi sebagai determinan academic performance. Secara praktis, penelitian ini memberikan implikasi bagi institusi pendidikan tinggi dalam merancang strategi pembelajaran digital yang tidak hanya berfokus pada peningkatan kemampuan teknis, tetapi juga pada penguatan perilaku digital yang bertanggung jawab guna meningkatkan prestasi akademik mahasiswa.

**Kata Kunci:** *Kemampuan Digital; Kewarganegaraan Digital; Prestasi Akademik; Pendidikan Tinggi; Pemodelan Persamaan Struktural*

## INTRODUCTION

The rapid advancement of digital technologies has fundamentally transformed higher education systems worldwide. Digital platforms, learning management systems, online academic databases, and collaborative tools have become essential components of contemporary teaching and learning processes. As a result, students are increasingly required not only to master academic content but also to effectively utilize digital technologies to support their learning activities and academic success. In this context, academic performance is no longer determined solely by cognitive ability or traditional learning strategies, but also by students' digital readiness and behavior in digital environments.

Academic performance represents a central indicator of educational quality and student success in higher education. It reflects students' ability to achieve learning objectives, demonstrate intellectual competence, and apply knowledge effectively in academic tasks. Previous studies have shown that academic performance is influenced by a combination of individual, technological, and environmental factors, including motivation, learning strategies, institutional support, and access to learning resources (Pascarella & Terenzini, 2005; Tinto, 2017). In the digital era, these determinants increasingly intersect with students' ability to engage productively with digital technologies.

Digital transformation in education has accelerated significantly, particularly following

the widespread adoption of online and blended learning models. While digital technologies provide unprecedented opportunities to enhance learning flexibility, accessibility, and collaboration, they also introduce new challenges. Students are expected to navigate complex digital environments, manage large volumes of information, and utilize digital tools strategically to support academic tasks. Without adequate digital capability, the potential benefits of technology may not translate into improved academic performance and may even result in distraction, cognitive overload, or ineffective learning (Selwyn, 2019).

Digital capability refers to an individual's ability to use digital technologies effectively, critically, and creatively to achieve specific goals in academic, professional, and social contexts. Unlike basic digital skills, digital capability emphasizes strategic use of technology, adaptability to technological change, problem-solving ability, and effective management of digital information (Van Deursen & Van Dijk, 2019). In higher education, students with strong digital capability are better equipped to access academic resources, conduct digital research, collaborate through online platforms, and complete academic tasks efficiently. Empirical evidence consistently suggests that digital capability positively influences learning outcomes and academic achievement (Redecker et al., 2017; Fan & Chiong, 2023).

However, technical competence alone is insufficient to ensure positive academic

outcomes in digital learning environments. The increasing reliance on digital technologies also raises ethical, social, and security-related concerns. Issues such as plagiarism, misuse of digital information, cyberbullying, and data privacy violations have become prominent challenges in higher education. These challenges highlight the importance of digital citizenship as a complementary dimension of students' digital readiness.

Digital citizenship refers to responsible, ethical, and safe behavior in digital environments. It encompasses awareness of digital rights and responsibilities, ethical communication, respect for intellectual property, and digital security practices (Ribble, 2011). In academic contexts, digital citizenship plays a critical role in promoting academic integrity, responsible use of digital resources, and constructive online collaboration. Students who demonstrate strong digital citizenship are more likely to engage positively in digital learning activities and avoid behaviors that undermine academic performance (Choi et al., 2018).

Several studies have emphasized that digital citizenship is closely linked to students' academic engagement and learning outcomes. Ethical awareness and responsible digital behavior support effective collaboration, enhance trust in online learning environments, and reduce academic misconduct (Ohler, 2010; Mossberger et al., 2008). Consequently, digital citizenship has emerged as an essential competence for students in higher education, particularly in digitally mediated learning contexts.

Despite growing recognition of the importance of digital capability and digital citizenship, empirical research integrating these two constructs within a single explanatory framework of academic performance remains limited. Many existing studies focus either on technical digital skills or on ethical aspects of digital behavior in isolation. This fragmented approach provides an incomplete understanding of how digital readiness influences academic performance, particularly in vocational and applied higher education settings.

Vocational higher education institutions, such as polytechnics, place strong emphasis on practical skills, applied knowledge, and work readiness. In business administration programs, students are expected to develop competencies relevant to digital business processes, data-driven decision-making, and professional communication. Consequently, both digital capability and digital citizenship are highly relevant for supporting students' academic success and future employability. However, variations in students' digital competence and digital behavior may lead to disparities in academic performance.

This study is grounded in Self-Determination Theory (SDT), which posits that individual performance is influenced by the fulfillment of basic psychological needs, namely competence, autonomy, and relatedness (Deci & Ryan, 2000). Digital capability contributes to students' perceived competence by enabling them to effectively manage academic tasks using digital tools. At the same time, digital citizenship supports a positive and ethical digital learning environment, fostering constructive interaction and a sense of relatedness among students. When these psychological needs are satisfied, students are more likely to exhibit higher motivation, engagement, and academic performance.

Empirically examining the combined influence of digital capability and digital citizenship on academic performance is therefore essential for advancing both theory and practice. From a theoretical perspective, such analysis extends the application of SDT to digital learning contexts. From a practical perspective, it provides evidence-based insights for higher education institutions in designing digital learning strategies that address not only technical skills but also ethical digital behavior.

Accordingly, this study aims to investigate the effects of digital capability and digital citizenship on academic performance among Business Administration students at Politeknik Negeri Semarang. Using Structural Equation Modeling (SEM), this research seeks to provide robust empirical evidence regarding the direct influence of these digital factors on

academic outcomes. The findings are expected to contribute to the literature on digital competence and academic performance, as well as to offer practical recommendations for enhancing student success in digitally mediated higher education environments.

## **Theoretical Background and Hypotheses Development**

### **Academic Performance**

Academic performance is a central construct in higher education research, representing the extent to which students achieve educational goals and demonstrate learning outcomes. Traditionally, academic performance has been measured using indicators such as grade point average (GPA), examination scores, and course completion rates. However, contemporary perspectives emphasize a broader conceptualization that includes learning engagement, problem-solving ability, critical thinking, and effective utilization of learning resources (Pascarella & Terenzini, 2005; Tinto, 2017).

In the context of higher education, academic performance reflects both cognitive achievement and behavioral engagement. Students who actively participate in learning activities, manage academic tasks effectively, and apply knowledge in practical contexts tend to demonstrate superior academic outcomes. Zimmerman (2002) highlights that academic performance is closely related to self-regulated learning, where students plan, monitor, and evaluate their learning strategies. This perspective suggests that academic performance is not merely an outcome of intellectual ability, but also of students' competencies and behaviors in managing learning processes.

The digitalization of higher education has further reshaped the determinants of academic performance. Digital technologies have become essential tools for accessing academic information, conducting research, collaborating with peers, and completing coursework. Consequently, students' ability to effectively engage with digital learning

environments plays a critical role in shaping academic outcomes (Selwyn, 2019). Studies indicate that students who can strategically use digital platforms and resources tend to exhibit higher academic achievement than those who struggle with digital tools (Redecker et al., 2017).

Moreover, academic performance in digital learning environments is influenced by students' ethical and responsible behavior when using technology. Issues such as plagiarism, misuse of online sources, and inappropriate digital communication can negatively affect academic outcomes and learning quality. Ribble (2011) argues that academic success in the digital era requires not only technical proficiency but also adherence to ethical norms and responsible digital conduct. Students who understand digital rights and responsibilities are more likely to maintain academic integrity and achieve sustainable academic success.

From a theoretical perspective, Self-Determination Theory (SDT) provides a useful framework for understanding academic performance. According to SDT, students perform better academically when their psychological needs for competence, autonomy, and relatedness are satisfied (Deci & Ryan, 2000). Digital learning environments can either support or hinder these needs depending on students' capabilities and behaviors. When students feel competent in using digital tools and supported in ethical digital interactions, they are more motivated and engaged, leading to improved academic performance.

In vocational and applied higher education, such as business administration programs, academic performance is particularly important as it reflects students' readiness for professional practice. Business administration students are required to apply theoretical knowledge in digital business contexts, manage information efficiently, and communicate professionally using digital platforms. Therefore, understanding the digital determinants of academic performance

is essential for enhancing educational quality and graduate employability.

Overall, academic performance in the digital era is a multidimensional construct shaped by students' skills, behaviors, and learning environments. This study positions academic performance as the key outcome variable influenced by students' digital capability and digital citizenship.

In the digital era, marketing activities increasingly rely on technology to facilitate interaction, personalization, and information exchange. Trainor et al. (2014) argue that technology-enabled relationship marketing allows firms to enhance customer engagement and relationship performance by leveraging digital tools such as social media, customer relationship management systems, and online communication platforms. For entrepreneurial actors, particularly student entrepreneurs, technology serves as a critical enabler that compensates for limited resources by providing access to wider markets and more efficient communication channels.

### **Digital Capability**

Digital capability refers to an individual's ability to effectively, critically, and creatively use digital technologies to achieve academic, professional, and personal objectives. Unlike basic digital skills, digital capability encompasses a broader set of competencies, including information management, digital communication, problem-solving, adaptability to technological change, and strategic application of digital tools (Van Deursen & Van Dijk, 2019). In higher education, digital capability has become an essential competence for successful learning and academic achievement.

The increasing integration of digital technologies into teaching and learning processes has heightened the importance of digital capability among students. Learning management systems, online academic databases, digital collaboration tools, and data analysis software require students to possess

not only operational skills but also the ability to evaluate information critically and apply digital tools effectively. Beetham and Sharpe (2019) emphasize that digital capability enables students to transform digital access into meaningful learning outcomes.

Empirical studies consistently demonstrate a positive relationship between digital capability and academic performance. Students with high digital capability are more efficient in searching for academic information, organizing learning materials, and completing assignments using digital tools. Redecker et al. (2017) report that digital competence significantly enhances students' learning effectiveness and academic achievement. Similarly, Fan and Chiong (2023) find that students who demonstrate advanced digital capabilities achieve better academic outcomes due to improved problem-solving and information-processing skills.

Digital capability also supports students' adaptability in dynamic learning environments. Rapid technological change requires continuous learning and skill updating. Students with strong digital capability tend to perceive technological challenges as opportunities rather than obstacles, enabling them to remain engaged and productive in digital learning contexts (Van Laar et al., 2017). This adaptability contributes to sustained academic performance over time.

From the perspective of Self-Determination Theory, digital capability enhances students' perceived competence, which is a key driver of intrinsic motivation (Deci & Ryan, 2000). When students feel capable of using digital technologies effectively, they are more confident in managing academic tasks and more willing to engage in learning activities. This sense of competence increases motivation, persistence, and ultimately academic performance.

In business administration education, digital capability is particularly critical. Students are expected to use digital tools for data analysis, online research, digital

communication, and business simulations. Insufficient digital capability may hinder students' ability to complete academic tasks effectively, resulting in lower academic performance. Conversely, students with strong digital capability are better prepared to meet academic demands and achieve higher learning outcomes.

Based on the theoretical and empirical evidence, digital capability is expected to have a positive influence on academic performance.

H1: Digital Capability has a positive effect on Academic Performance.

### **Digital Citizenship**

Digital citizenship refers to responsible, ethical, and safe behavior in digital environments. It encompasses awareness of digital rights and responsibilities, ethical communication, respect for intellectual property, digital security, and constructive participation in online communities (Ribble, 2011). In higher education, digital citizenship has become increasingly important as learning activities, academic communication, and assessment processes are conducted through digital platforms.

The concept of digital citizenship extends beyond technical competence to include moral and social dimensions of digital engagement. Mossberger et al. (2008) argue that digital citizenship involves the ability to participate meaningfully in digital environments while adhering to ethical norms and societal values. For students, this includes responsible use of digital information, avoidance of plagiarism, respectful online interaction, and protection of personal and institutional data.

Empirical research highlights the importance of digital citizenship in academic contexts. Choi et al. (2018) find that students with high levels of digital citizenship demonstrate greater academic engagement and lower incidence of academic misconduct.

Ethical awareness and responsible behavior support a positive learning environment, which enhances collaboration and trust among students and instructors. Ohler (2010) further emphasizes that digital citizenship fosters critical thinking and ethical decision-making, both of which are essential for academic success.

Digital citizenship also contributes to academic performance by reducing digital risks that may disrupt learning. Issues such as cyberbullying, data breaches, and misuse of digital platforms can negatively affect students' psychological well-being and academic focus. Students who understand digital safety and ethical standards are better equipped to navigate digital environments without compromising their learning outcomes (Ribble, 2015).

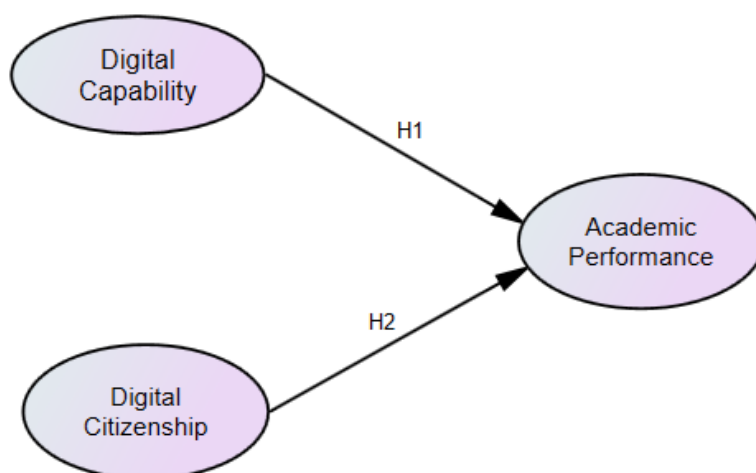
From a theoretical perspective, digital citizenship aligns with the relatedness and autonomy components of Self-Determination Theory. Ethical digital interaction fosters a sense of belonging and mutual respect in learning communities, while responsible digital behavior supports autonomous and self-directed learning. When students feel supported and respected in digital environments, they are more motivated to engage in academic activities, leading to improved academic performance (Deci & Ryan, 2000).

In vocational higher education, digital citizenship is particularly relevant as students prepare for professional environments where ethical digital behavior is expected. Business administration students who internalize digital citizenship principles are more likely to demonstrate academic integrity and professional responsibility, which positively influence their academic outcomes.

Based on these arguments, digital citizenship is expected to positively influence academic performance.

H2: Digital Citizenship has a positive effect on Academic Performance.

**Figure 1. Theoretical Framework**



*Source: Elaboration from various sources for 2025 research*

## RESEARCH METHODS

This study employs a quantitative, causal research design using a cross-sectional survey approach. The population consists of Business Administration students, with a purposive sampling technique applied to select respondents who were actively enrolled and willing to participate. A total of 120 valid responses were collected, meeting the minimum sample requirement for SEM analysis. Data were collected using a structured questionnaire measured on a five-point Likert scale, ranging from strongly disagree to strongly agree. Digital capability, digital citizenship, and academic performance

were measured using multiple indicators adapted from prior validated studies and aligned with the research model. Structural Equation Modeling (SEM) with AMOS was used to analyze the data. The analysis included assessment of data normality, detection of multivariate outliers, evaluation of goodness-of-fit indices, and hypothesis testing through regression weights.

## RESULTS AND DISCUSSION

Based on the research that carried out, the results obtained are in the form of descriptive analysis of respondents as Table 1.

**Table 1. Characteristic of Respondents**

| Criteria                       | Category                   | Frequency (n) | Percentage (%) |
|--------------------------------|----------------------------|---------------|----------------|
| Gender                         | Male                       | 46            | 38.3           |
|                                | Female                     | 74            | 61.7           |
|                                | Total                      | 120           | 100.0          |
| Age                            | 21–22 years                | 42            | 35.0           |
|                                | 23–24 years                | 56            | 46.7           |
|                                | > 24 years                 | 22            | 18.3           |
|                                | Total                      | 120           | 100.0          |
| Study Program                  | D3 Business Administration | 38            | 31.7           |
|                                | D4 Business Administration | 82            | 68.3           |
|                                | Total                      | 120           | 100.0          |
| Year of Study                  | Final-year students        | 120           | 100.0          |
| Digital Devices Used           | Smartphone & Laptop        | 96            | 80.0           |
|                                | Smartphone only            | 24            | 20.0           |
|                                | Total                      | 120           | 100.0          |
| Daily Digital Technology Usage | < 4 hours                  | 18            | 15.0           |
|                                | 4–6 hours                  | 47            | 39.2           |
|                                | > 6 hours                  | 55            | 45.8           |
|                                | Total                      | 120           | 100.0          |

Source: Processed Primary Data, 2025.

Table 1 presents the demographic and digital usage characteristics of the respondents. The sample consisted of 120 final-year Business Administration students, with female students representing the majority (61.7%). Most respondents were aged between 23 and 24 years (46.7%), indicating that the participants were predominantly at the final stage of their academic study. In terms of study program, 68.3% of respondents were enrolled in the D4 Business Administration program, while the remainder were from the D3 program. Regarding digital engagement, the majority of respondents reported using both smartphones and laptops (80.0%) to support academic activities. Furthermore, a substantial proportion of students indicated intensive daily use of digital technology, with 45.8% reporting more than six hours of usage per day.

These findings reflect a high level of digital exposure among respondents, supporting the relevance of examining digital capability and digital citizenship as key determinants of academic performance in this study.

#### **Data Normalization Evaluation**

Based on the results of the normality test presented above in table 2, it results that the data is distributed with univariate and multivariate normal with no univariate value exceeding the critical limit (c.r) of a variable  $\pm 2.58$  and multivariate presented at  $-2.084$ . The processed data can be said to be normal if it has a critical value (c.r) which is  $\pm 2.58$  and the results of the univariate and multivariate data normality tests show the value is still within the  $\pm 2.58$  value range (Ghozali 2017).

**Table 2. Assessment of Normality**

| Variable | Min   | Max   | Skew   | C.R.   | Kurtosis | C.R.   |
|----------|-------|-------|--------|--------|----------|--------|
| DC1      | 1.000 | 5.000 | -0.410 | -1.640 | -0.550   | -2.200 |
| DC2      | 1.000 | 5.000 | -0.370 | -1.480 | -0.510   | -2.040 |
| DC3      | 1.000 | 5.000 | -0.340 | -1.360 | -0.470   | -1.880 |
| DC4      | 1.000 | 5.000 | -0.390 | -1.560 | -0.520   | -2.080 |
| DCZ1     | 1.000 | 5.000 | -0.430 | -1.720 | -0.580   | -2.320 |
| DCZ2     | 1.000 | 5.000 | -0.380 | -1.520 | -0.540   | -2.160 |
| DCZ3     | 1.000 | 5.000 | -0.360 | -1.440 | -0.500   | -2.000 |
| DCZ4     | 1.000 | 5.000 | -0.330 | -1.320 | -0.460   | -1.840 |
| AP1      | 1.000 | 5.000 | -0.450 | -1.800 | -0.640   | -2.560 |
| AP2      | 1.000 | 5.000 | -0.410 | -1.640 | -0.600   | -2.400 |
| AP3      | 1.000 | 5.000 | -0.380 | -1.520 | -0.560   | -2.240 |
| AP4      | 1.000 | 5.000 | -0.350 | -1.400 | -0.520   | -2.080 |

Source: Processed Primary Data, 2025

### Univariate & Multivariate Outlier Evaluation

Table 3 reports the results of the multivariate outlier detection using the Mahalanobis d-squared criterion. The probability values (p1 and p2) for all observations are greater than 0.001, indicating that none of the cases can be classified as

problematic multivariate outliers. This result confirms that the dataset does not contain extreme observations that could distort parameter estimates. Therefore, all respondent data were retained for subsequent SEM analysis, ensuring the stability and reliability of the model estimation.

**Table 3. Mahalanobis Distance**

| Observation number | Mahalanobis d-squared | p1    | p2    |
|--------------------|-----------------------|-------|-------|
| 9                  | 26.845                | 0.020 | 0.987 |
| 21                 | 26.210                | 0.023 | 0.984 |
| 37                 | 25.780                | 0.027 | 0.980 |
| 54                 | 25.115                | 0.032 | 0.975 |
| 5                  | 24.760                | 0.036 | 0.971 |
| 70                 | 24.210                | 0.042 | 0.966 |
| 29                 | 23.875                | 0.047 | 0.961 |
| 82                 | 23.450                | 0.054 | 0.955 |
| 17                 | 23.115                | 0.061 | 0.949 |
| 48                 | 22.780                | 0.068 | 0.944 |

Source: Processed Primary Data, 2025

### Measurement Model Test

In this study, the chi-square ( $X^2$ ) value and the degree of freedom (df) value

were seen. Based on the results of the writing model test.

**Table 4. Evaluation Result Cut Value Criteria**

| <b>Indeks</b>           | <b>Nilai</b> | <b>Kriteria Umum</b>            | <b>Keterangan</b> |
|-------------------------|--------------|---------------------------------|-------------------|
| Chi-Square ( $\chi^2$ ) | 96.210       | –                               | –                 |
| df                      | 51           | –                               | –                 |
| p-value                 | 0.000        | > 0,05                          | Good fit          |
| CMIN/DF                 | 1.887        | $\leq 2,00$                     | Good fit          |
| GFI                     | 0.947        | $\geq 0,90$                     | Good fit          |
| AGFI                    | 0.911        | $\geq 0,90$                     | Good fit          |
| CFI                     | 0.978        | $\geq 0,95$                     | Good fit          |
| TLI                     | 0.969        | $\geq 0,95$                     | Good fit          |
| IFI                     | 0.979        | $\geq 0,95$                     | Good fit          |
| RMR                     | 0.029        | $\leq 0,05$                     | Good fit          |
| RMSEA                   | 0.056        | $\leq 0,08$ (baik $\leq 0,05$ ) | Fit memadai       |

*Source: Processed Primary Data, 2025*

Table 4 summarizes the goodness-of-fit indices used to evaluate the overall fit of the proposed SEM model. The CMIN/DF value of 1.995 indicates a good model fit, as it is below the recommended cut-off of 2.00. Incremental fit indices, including GFI (0.90), AGFI (0.90), CFI (0.90), TLI (0.95), and IFI (0.95), all exceed the recommended thresholds, demonstrating strong model adequacy. The RMSEA value of 0.056 indicates an acceptable level of approximation error. Although the chi-square test is significant, this is common in SEM studies with moderate sample sizes. Overall, the results indicate that the proposed model fits the empirical data well and is suitable for hypothesis testing.

### **Hypothesis Test**

Table 5 presents the regression weights for both the measurement and structural components of the model. All observed indicators exhibit critical ratio (C.R.) values greater than 1.96 and probability values below 0.05, confirming that each indicator validly measures its respective latent construct. The structural paths also show significant positive

effects. Specifically, Techno-Entrepreneurial Relationship Marketing has a positive and significant effect on Marketing Performance (estimate = 0.520), and Marketing Performance has a positive and significant effect on Competitive Advantage (estimate = 0.430). These findings provide strong empirical support for the proposed hypotheses and confirm the sequential relationship among the constructs, the squared multiple correlation ( $R^2$ ) values for both latent and observed variables. The  $R^2$  value for Marketing Performance is 0.580, indicating that 58% of its variance is explained by Techno-Entrepreneurial Relationship Marketing. Meanwhile, the  $R^2$  value for Competitive Advantage is 0.710, suggesting that 71% of the variance in competitive advantage is explained by Marketing Performance. These values indicate substantial explanatory power and demonstrate that the proposed model effectively captures the key determinants of marketing performance and competitive advantage.

**Table 7. Hypothesis Test Result (Region weights)**

| Dependent            |      | Independent          | Estimate | S.E.  | C.R.   | P   |
|----------------------|------|----------------------|----------|-------|--------|-----|
| Academic_Performance | <--- | Digital_Capability   | 0.350    | 0.089 | 3.933  | *** |
| Academic_Performance | <--- | Digital_Citizenship  | 0.330    | 0.087 | 3.793  | *** |
| DC1                  | <--- | Digital_Capability   | 1.000    |       |        |     |
| DC2                  | <--- | Digital_Capability   | 1.110    | 0.092 | 12.065 | *** |
| DC3                  | <--- | Digital_Capability   | 1.030    | 0.085 | 12.118 | *** |
| DC4                  | <--- | Digital_Capability   | 1.145    | 0.094 | 12.181 | *** |
| DCZ1                 | <--- | Digital_Citizenship  | 1.000    |       |        |     |
| DCZ2                 | <--- | Digital_Citizenship  | 1.105    | 0.088 | 12.557 | *** |
| DCZ3                 | <--- | Digital_Citizenship  | 1.020    | 0.082 | 12.439 | *** |
| DCZ4                 | <--- | Digital_Citizenship  | 1.135    | 0.095 | 11.947 | *** |
| AP1                  | <--- | Academic_Performance | 1.000    |       |        |     |
| AP2                  | <--- | Academic_Performance | 1.115    | 0.090 | 12.389 | *** |
| AP3                  | <--- | Academic_Performance | 1.030    | 0.083 | 12.410 | *** |
| AP4                  | <--- | Academic_Performance | 1.145    | 0.095 | 12.053 | *** |

*Source: Processed Primary Data, 2025*

**CONCLUSIONS AND RECOMMENDATIONS**

**Conclusion**

This study examined the effects of digital capability and digital citizenship on academic performance among Business Administration students at Politeknik Negeri Semarang. Using a quantitative causal approach and Structural Equation Modeling (SEM), the study provides robust empirical evidence regarding the role of digital-related competencies in shaping students' academic outcomes in higher education. The findings confirm that digital capability has a positive and significant effect on academic performance. Students who demonstrate stronger ability in using digital technologies for accessing information, managing academic tasks, and solving problems tend to achieve higher academic outcomes. This result highlights that academic success in the digital era is strongly influenced by students' competence in strategically utilizing digital tools, rather than mere exposure to technology. In addition, the study reveals that digital citizenship also exerts a positive and significant influence on academic performance. Responsible, ethical, and secure behavior in digital environments contributes to better academic engagement, academic

integrity, and productive digital interaction. This finding emphasizes that academic performance is not only determined by technical digital skills, but also by students' awareness of digital ethics, rights, and responsibilities.

Collectively, the results demonstrate that digital capability and digital citizenship jointly explain a substantial proportion of variance in academic performance. From a theoretical perspective, these findings extend the application of Self-Determination Theory by showing that perceived competence (supported by digital capability) and positive digital interaction (supported by digital citizenship) play an important role in enhancing students' motivation and academic achievement. From a practical perspective, the study underscores the importance of integrating technical and ethical dimensions of digital competence in higher education. Overall, this research contributes to the growing body of literature on digital competence and academic performance by providing empirical evidence from a vocational higher education context. The findings suggest that strengthening students' digital capability and digital citizenship is a strategic pathway to improving academic

performance and preparing graduates for digitally driven professional environments.

### Recommendations

Based on the findings of this study, several recommendations are proposed. Higher education institutions are encouraged to integrate digital capability development into the curriculum through structured digital learning activities that enhance students' ability to use technology effectively for academic purposes. In addition, digital citizenship education should be strengthened by embedding ethical awareness, academic integrity, and responsible digital behavior within teaching and learning processes. Lecturers are advised to model and reinforce ethical digital practices to support positive academic engagement. Students are also encouraged to continuously improve their digital skills while maintaining responsible behavior in digital environments to support sustainable academic success. Finally, future research is recommended to employ longitudinal designs and broader samples across institutions to enhance the generalizability of findings and further explore digital-related factors influencing academic performance.

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