IRJE |Indonesian Research Journal in Education| |Vol. 9| No. 2|Dec|Year 2025|

A quantitative study: Can information system strategy boost performance in private higher education?

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Abstract

This research aims to examine the influence of Information Systems Strategy (ISS) and Digital Transformation (DT) on the performance of private universities amidst theoretical findings suggesting that ISS and DT are influenced by internal factors Management Capability (MC) and external factors Government Business Support (GBS). A quantitative approach survey technique was used with the involvement of 92 private universities in the LLDIKTI Region IV West Java and Banten participating as research samples. The test method adopts the partial least square (PLS) structural equation modeling (SEM) model. The results showed that there is a positive significance of management capability on university performance-both directly and through information systems strategy and digital transformation. This finding emphasizes that capable management can project the formulation and formulate and organize the implementation of an effective information technology strategy, as well as drive a strategy, as well as drive an appropriate digital transformation process.

Keywords

Digital transformation, government business support, higher education performance, information systems strategy, management capability

Article History

Received 06 February 2025
Accepted 26 May 2025

How to Cite

Munawar, A., Suryana., Disman., & Hendrayati, H. (2025). A quantitative study: Can information system strategy boost performance in private higher education? *Research Journal in Education |IRJE|, 9*(2), 625 - 641. https://doi.org/10.22437/irje.v9i02.44507

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Introduction

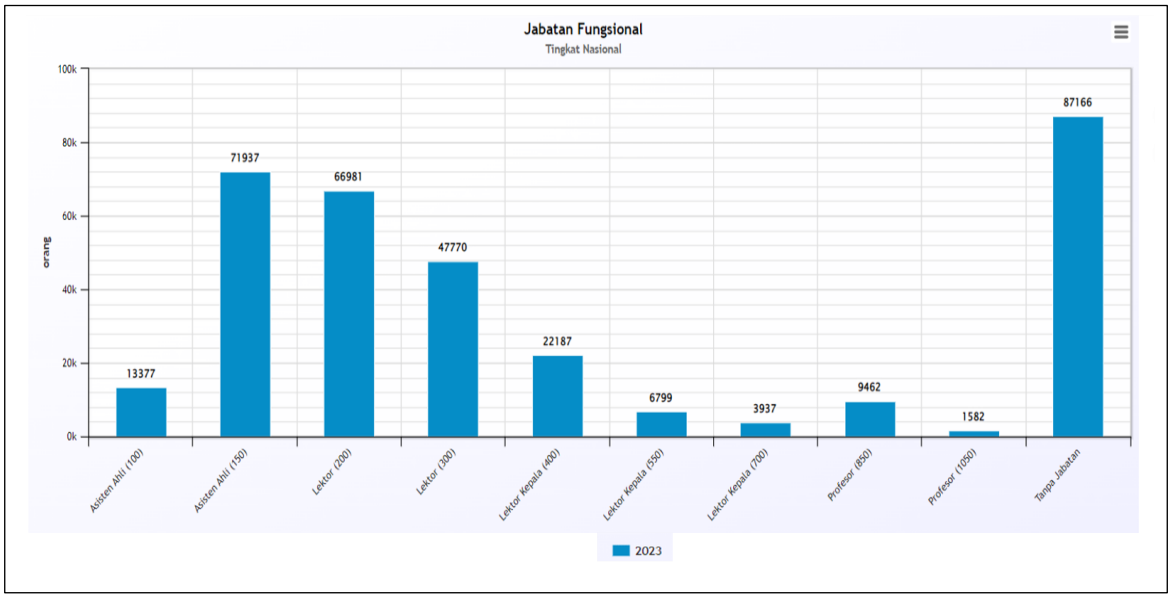
Higher education performance measurement is an important complex issue (Abadi et al., 2019) to ensure quality higher education evaluation (Noaman et al., 2017). In line with this, the government has approached the design of policies for its higher education system using various methods (Capano et al., 2020). The government implements various changes to enhance the performance of higher education (Capano & Pritoni, 2020). Measuring and improving the performance of higher education has captured the attention of several education researchers. Two of them are Martin-Sardesai et al. (2019) and Sutapa et al. (2018), which use various methods to measure university performance (Adisel, 2019; Hasan, 2020; Kusnendi et al., 2018; Sutanto et al., 2018). One of these methods includes using business models in higher education, which helps it to keep innovating with the digital changes and use new technologies like Big Data and Artificial Intelligence (AI) to improve personalized teaching, support writing scientific papers, and apply cloud and blockchain technology and fuzzy inference systems utilized to predict higher education performances. These utilizations inextricably link efforts to address issues in higher education performance.

Performance problems in higher education also occur in Indonesia. Such as organizational culture problems (Idris, 2019; Yusuf, 2020), weaknesses in university performance in aspects of services, technology, and human resource competencies (Indriati et al., 2023), lecturer competence (Yuliani & Sari, 2024), high levels of stress in the student learning process (Fahri et al., 2020), transformation of national standards and higher education accreditation (Limbong & Asbari, 2024; Ruhimat et al., 2024), policy and implementation of *Merdeka Belajar Kampus Merdeka* or *MBKM* (Antoni et al., 2022), utilization of artificial intelligence technology as higher education innovation in the era of digital transformation (Sandy et al., 2023) that are not yet appropriate, the role of leadership in higher education (Alwi, 2022; Arquisola et al., 2020), clustering, mergers, and acquisitions of higher education institutions to improve competencies, education standards, and effective quality of higher education institutions (Arafah et al., 2021). This includes Soewarno and Tjahjadi (2020) and Tjahjadi et al. (2019), which highlighted the management efforts of higher education institutions in Indonesia to accommodate the dynamic trends of the competitive environment and stakeholder interests. These studies reflect the problems and the transition process experienced by various higher education institutions in Indonesia, which require systemic, periodic, and sustainable performance measurement.

Measuring the performance of Indonesian higher education is inseparable from the quality of human resources (HR), especially educators. Some of the problems related to educators in higher education are that there are still many lecturers who do not have functional academic positions, the background of academic qualifications S3 is still minimal, and there is a lack of ability to master information technology, especially among elderly lecturers. Based on data from the Ministry of Higher Education, Science and Technology's Integrated Resource Information System (Sister) Kemendikbud (2023a), it is recorded nationally, until the end of 2023, that out of 331,198 permanent lecturers, 87,166, or 26.32% of them, do not yet have functional positions. Out of the 100 lecturers with the position of expert assistant, 13,377 (4%) do not yet have a functional position. Similarly, among expert assistants classified as 150, 71.938 (21.72%) do not yet have functional positions. On the other hand, the highest

functional position of professors is still very low, namely professor 1050, with as many as 1582 (0.48%) lecturers. Additionally, 9,462 lecturers (2.86%) are at the Professor 850 level as in the figure below.

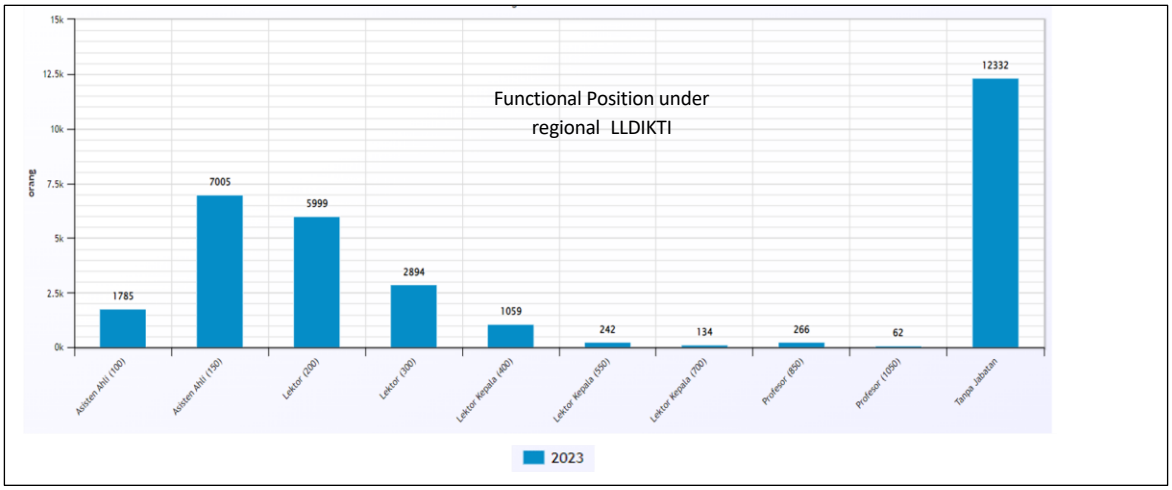
Figure 1. *National level lecturer functional position*



Source: Kemendikbud (2023b)

The data are crucial in efforts to improve the performance of higher education. A functional position in the academic community recognizes a lecturer's academic ability. Data regarding the academic functional positions of lecturers in LLDIKTI Region IV (West Java and Banten) also reveals information that is nearly identical to related data at the national level as in figure below.

Figure 2. *Functional position of lecturers in the environment of LLDIKTI Region IV*



Source: Kemendikbud (2023a)

Figure 2 shows that out of 31,778 permanent lecturers, those without functional positions still hold the highest rank, reaching 38.81% (1,332) by the end of 2023; 5.62% (1,785) are expert assistants at level 100, and 22.04% (7,005) are expert assistants at level 150. Additionally, there is a lack of functional positions for professors; only 0.2% (62) are professors at level 1050, and 0.84% (266) are professors at level 850.

In addition to functional positions, the educational qualifications of lecturers are also an important component in improving the performance of Indonesian higher education institutions. The government has made various efforts to encourage the improvement of higher education human resources, one of which is by providing various access facilities and scholarships for all lecturers in Indonesia to pursue education to the S3 level. Data shows that among the 280,467 permanent lecturers spread throughout Indonesia, many still have educational backgrounds that do not meet the standard academic qualifications outlined in Law Number 14 of 2005 concerning Teachers and Lecturers, article 46, paragraphs 1 and 2, which stipulates that the minimum academic qualifications of lecturers are a master's degree (S2) to teach at the diploma and undergraduate levels and a doctoral degree (S3) to teach at the postgraduate program level.

When various efforts to improve the performance of Indonesian higher education continue to be carried out, both through institutional and research program accreditation processes (Ruhimat et al., 2024), increasing the Gross Participation Rate, encouraging research and community service performance, and improving lecturers' academic qualifications - all of which deserve appreciation. However, the performance of universities in Indonesia has not yet reached the expected results. This is evident from the ranking results of Quacquarelli Symonds (QS). After conducting an in-depth assessment of five indicator dimensions—including research and discovery, learning experience, graduate employability, global engagement, and sustainability (Manning, 2021)—the QS World University Ranking (QS WUR) was published. It prompts the inclusion of numerous global universities (Avenali et al., 2024) and Asian nations (Manning, 2021), including Indonesia (Ibrahim & Fadhli, 2021). In 2025, only 26 Indonesian universities made it to the QS WUR 2025 nomination. Nineteen are state universities, and seven are private. In fact, by the end of 2024, there will be 125 state and 2,812 private universities in Indonesia (Badan Pusat Statistik, 2024).

The number of Indonesian universities included in QS WUR has not increased; 26 Indonesian universities listed in the QS WUR publication for 2025 remain the same as in the 2024 publication. This finding indicates that the performance of most Indonesian universities is still far behind and requires new strategies to improve them. This is especially true for private higher education entities, which are the least recognized in QS WUR publications.

On the other hand, two theories correlate with efforts to solve the problem of private universities' lagging performance. First, the Resources-Based View (RBV) theory promotes the opportunity to reconfigure the internal and external competencies of the organization in the face of rapid environmental change (Murschetz et al., 2020). To achieve a new competitive advantage, be innovative and have agility. Second, agency theory emphasizes the need for organizational governance principles to align interests and reduce differences between management and owners (Martins et al., 2019). This serves as an alternative to mediating the intervention of ambitions and personalities of key individuals, whom the "prophets of

regulation" tend to dominate in various historical contexts (McGraw & Harbison, 2020) within private higher education institutions.

By putting the Resource-Based View (RBV) theory at the center of efforts to improve the performance of private higher education institutions in Indonesia, factors strongly suspected to affect their performance include internal and external factors. The internal factor in question is management capability (MC). On the other hand, the external factors are government business support (GBS), information systems strategy (ISS), and digital transformation (DT), which help private higher education institutions in Indonesia adopt digital changes as part of education digitization (Cortellazzo et al., 2019; Zekan et al., 2023).

Although the correlation between these theories and higher education performance can be explained terminologically, the proof has barely been obtained. Private higher education entities in Indonesia struggle to improve their performance through various approaches. It is from this gap that this research stands. This research looks at how ISS and DT affect the performance of private higher education institutions, based on theories that suggest MC impacts ISS and DT as internal factors, and GBS as an external factor. This research promises a new strategy that will be tested as an alternative to improve the performance of private universities in Indonesia.

Literature Review

Management capability

Management capability (MC) is important for organizational success and competitiveness. It encompasses various dimensions, including technology capability, age management (Kadefors et al., 2020), and project management (Zhang et al., 2020). The developed and validated concept of experience capability enables a higher focus on an organization's ability to manage customer experience effectively (Ponsignon et al., 2020). Organizational attributes such as senior management commitment, risk management, and staff competence are critical to an integrated safety, health, and environmental management capability (Asah-Kissiedu et al., 2020). Innovation management capabilities, influenced by intellectual and emotional assets, impact organizational performance. However, the field faces challenges related to infinite regress and initial conditions in theoretical explanations (Hallberg & Felin, 2020). Public sector management capabilities are essential for socio-economic development and successful program implementation.

Government business support

Government Business Support (GBS) plays an important role in driving sustainable development and innovation in various sectors, aligning with one of the indicators in the university's performance assessment. In the agriculture sector, for example, subsidies, programs, and regulations encourage sustainable practices and rural development (Barbosa, 2024). Government support improves financial literacy, access to finance, and green value creation, contributing to the sustainability of their business (Aslam et al., 2023). In the technology sector, government support signals creditworthiness to banks for new energy

companies and encourages the adoption of cashless payment systems (Puspitasari & Salehudin, 2022). Government support also influences a company's environmental strategy (Benito-Hernández et al., 2021) and helps mitigate the economic impact during crises such as COVID-19 (Wang et al., 2020). In addition, government initiatives play an important role in fostering the startup ecosystem through funding and incubation programs. Various configurations of institutional and financial tools can effectively leverage private capital for infrastructure projects (Han & Guo, 2022).

Information system strategy

Information Systems Strategy (ISS) is critical for innovation, competitiveness, and organizational performance in the digital age (Kitsios & Kamariotou, 2021). This involves aligning IT capabilities with goals to enable dynamic capabilities and improve enterprise performance (Yoshikuni et al., 2021). ISS planning methodologies, such as the Ward and Peppard model and the Tozer method, utilize various analytical tools, such as SWOT, value chain, and McFarlan's Strategic Grid, to develop an effective IS/IT portfolio (Agnes & Wijaya, 2020). Digitalization challenges traditional ISS approaches, necessitating new perspectives in crafting digital strategies (Morton et al., 2022). Implementing an integrated information system can provide a competitive advantage, especially in sectors such as education and pharmaceuticals (Gaol et al., 2020; Huerta-Riveros et al., 2020). Overall, the ISS is essential for organizations to navigate the complexities of the digital age and achieve strategic goals.

Digital transformation

The role of digital transformation has become a global concern after the emergence of the Covid-19 pandemic (Firmansyah et al., 2024; Mardani et al., 2020) and has become a new approach for companies to gain a competitive advantage in the context of intense and dynamic market competition (Chen et al., 2021). Digital transformation is considered a driver of growth and competitiveness, which is determined by new technologies and approaches and is strongly linked to strategic management and strategic approaches (Cervinka & Novak, 2022). Therefore, companies are racing to change their structure and governance in response to new social, environmental, and economic challenges (Casado-Aranda et al., 2020). Likewise, higher education institutions are organizations that claim to be leaders of change and have high competitiveness in their domain, so it is only natural that they are navigating the era of significant change called digital transformation (Anh et al., 2024) and have made it a priority in the face of various unfavorable situations in the 21st century (Benavides et al., 2020). Uncertainty and volatility will never end, so digital transformation is an ongoing process, primarily to support sustainable development (Leal Filho et al., 2024), not only because of new technologies and approaches but also because businesses, markets, and competitors will continue to change.

The performance of private universities in Indonesia

Private universities (PTS) are established or organized by the community by establishing

an organizing body that is a legal entity with non-profit principles and must obtain a license from the Minister of Education and Culture (Kemendikbudristek, 2020). The performance of private universities in Indonesia is still not optimal, both in terms of services and the effectiveness of technology utilization (Indriati et al., 2023), so only 7 HEIs are recognized in QS WUR publications in 2024 and 2025.

Methodology

Research design

This research aims to examine the influence of Information Systems Strategy (ISS) and Digital Transformation (DT) on the performance of private universities amidst theoretical findings that show that ISS and DT are influenced by internal factors of Management Capability (MC) and external factors of Government Business Support (GBS). To achieve that goal, the quantitative approach of the explanatory model was adopted.

Data collection and research participants

Data was collected using an online survey technique (Elangovan & Sundaravel, 2021). The survey instrument was designed to collect data covering five research variables. The measurement items were taken from previous research and modified to fit this research. MC was measured using eight items from Pudjiarti and Darmanto (2020). Barbosa (2024) provided nine items for measuring GBS. ISS uses eight items from Huerta-Riveros et al. (2020), and DT uses 14 items from Matt et al. (2015). Furthermore, nine items were adopted from Mouzas and Bauer (2022) to measure college performance. All of them are put together into a survey made up of optional statements that use a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree, to measure the responses of respondents from 92 private universities in the LLDIKTI Region IV West Java and Banten for the research.

Data analysis

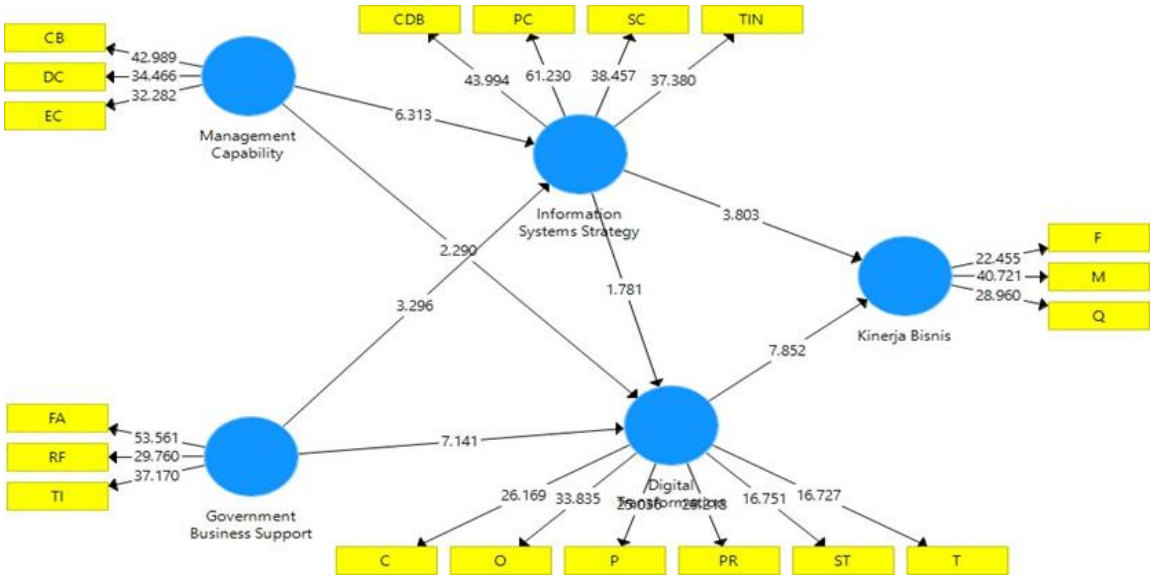
In this research, data analysis was conducted using Smart PLS 3.0 software. This software is used to assess the reliability, convergent validity, and discriminant validity of the constructs in this research, as well as to test the hypotheses that have been formulated (Ponsignon et al., 2020). The Partial Least Squares Structural Equation Modeling (PLS-SEM) method was chosen for its suitability in handling data that is not normally distributed (Johnson & Christensen, 2024). In addition, this method is suitable for research with a relatively small sample size, such as involving less than 200 respondents (Charli et al., 2022; Mohiuddin et al., 2022).

Findings

Each variable must undergo a reliability test to provide confidence in the model. This test can also be expressed as a measure of the extent to which a set of measures can correctly

represent the research concept and is free from systematic or random errors. The linkage of variable dimensions to indicators relates to how well the research measures define the concept (Hair et al., 2018). It not only assesses the accuracy of the measuring instrument but also evaluates reflective indicators. The constructions are recorded as convergent and discriminant validity. Convergent validity is good when each item has an Average Variance Extracted (AVE) greater than or equal to 0.50 (Hair et al., 2018). See Figure 3.

Figure 3. *Complete model and structural parameter estimation results*



Source: Data analysis

The overall results for the loading factor value, AVE, and composite reliability are high, as all dimensions have a loading factor score above 0.70 or a t statistic greater than 1.96 with a p-value less than 0.05. Thus, it can be said to be valid. Likewise, each dimension produces a composite reliability value greater than 0.70, so it is concluded to be reliable.

The three dimensions used to measure the management capability (MC) variable have a loading factor score greater than 0.70. Therefore, the three dimensions are declared valid and reliable. The three dimensions used to measure the Government Business Support (GBS) variable have a loading factor score greater than 0.70, so they can be concluded to be valid and reliable. The four dimensions used to measure the Information Systems Strategy (ISS) variable have a loading factor score greater than 0.70, showing that they are reliable and valid. The six dimensions used to measure the digital transformation (DT) variable have a loading factor score greater than 0.70, so they can be considered valid and reliable. The three dimensions used to measure the business performance variable have a loading factor value greater than 0.70, so it can be concluded that the three dimensions produce a composite reliability of more than 0.70, which means it is valid and reliable.

To evaluate the structural relationship between latent variables, hypothesis testing must be carried out on the path coefficient between variables by comparing the p-value with 0.05. The output of Smart PLS 3.0 provides the p-value. All hypotheses are tested and analyzed

based on the results obtained from data processing, as shown in Table 1.

Table 1. *Path coefficient test results*

Hypothesis	Path coefficient	Standard deviation	T-statistics	P-value	Decision
Digital transformation → Business performance	0,617	0,083	7,47	0.000	Accepted
Information system strategy → Business performance	0,177	0,106	1,668	0.096	Rejected
Information system strategy → Digital transformation→ Business performance	0,534	0,081	6,629	0.000	Accepted
Information system strategy → Digital transformation	0,316	0,086	3,674	0.000	Accepted
Management capability → Digital transformation	0,258	0,114	2,274	0.023	Accepted
Government business support → Digital transformation	0,527	0,074	7,153	0.000	Accepted
Management capability → Information system strategy	0,612	0,096	6,409	0.000	Accepted
Strategy management capability → Information system strategy → Digital transformation	0,779	0,061	12,834	0.000	Accepted
Government business support → Information system strategy	0,326	0,098	3,332	0.001	Accepted
Government business support → Information system strategy → Digital transformation	0,75	0,071	10,518	0.000	Accepted

Discussion

The test results between digital transformation (DT) and business performance are positive. The relationship between the two variables is significant. These results indicate a relationship between digital transformation and the achievement of the company's business performance, namely the performance of private universities. The more effective PTS's digital transformation practices are, the more directly they will impact the improvement of PTS's performance achievements. The test results between information systems strategy (ISS) and business performance show a positive relationship. This evidence indicates that the presence of ISS can positively impact the achievement of company performance. The test results between ISS and business performance through DT also show a positive correlation. The relationship between these variables is significant when considered together. This result indicates a relationship between ISS and business performance, directly or through DT.

The findings of this research are relevant to various previous studies conducted in other sectors. Three recent research studies conducted by Raja et al. (2024), Savastano et al. (2022), and Suhari et al. (2024) confirm that digital transformation (DT) strategies significantly

improve organizational efficiency, productivity, and competitiveness. The relationship between DT and business performance involves digital leadership, entrepreneurial motivation, and organizational culture (Raja et al., 2024). DT will significantly impact organizational performance, namely increasing operational efficiency, accelerating decision-making, and improving customer experience at PTS. In addition, digital transformation also opens up opportunities for product and service innovation that is more relevant to market needs and allows PTS to adapt quickly to changing market conditions. Using technology, PTS can expand market reach, improve team collaboration, and provide faster and more accurate responses to customer requests, ultimately improving PTS's overall performance.

Similarly, the researchers found a relationship between ISS and business performance. This result is relevant to Santa et al. (2020), who explained that ISS alignment can improve company performance. However, Kamariotou (2022) and Antonio and Safitri (2023) did not find a direct effect of ISS on performance. In addition, Wang et al. (2020) asserted that ISS, albeit indirectly, can influence business performance through mediating factors such as DT.

This means that a well-designed information system can support the proper implementation of digital technology, enable more efficient data management, accelerate the decision-making process, and improve communication and collaboration between departments in PTS. With digital transformation driven by integrated information systems, PTS can optimize operational activities, respond to market changes faster, and create better customer experiences. These factors, in turn, can improve overall business performance at PTS by harnessing the potential of technology to create a competitive advantage, expand markets, and increase productivity (AlGhamdi, 2022; Alotaibi & Alshehri, 2023).

The test results between MC and DT show a positive relationship. The relationship between these variables is significant. This result indicates that MC will have a positive effect on DT. This finding is relevant to research publications (Fu et al., 2023), which explained that MC has a positive impact on DT due to its usefulness in overcoming strategic inertia and improving the efficiency of organizational capital allocation.

MC has a very close relationship with DT because strong managerial skills are a key factor in an educational organization's successful implementation of digital transformation (Balcioğlu & Artar, 2024; Dikdik et al., 2024). Managers who manage resources, lead change, and make strategic decisions can adopt and utilize new technologies more effectively. This enables HEIs to plan, organize, and direct teams to make the most of digital technologies to achieve organizational goals efficiently and innovatively (Espina-Romero et al., 2023; Gierlich-Joas et al., 2020).

The test results between GBS and DT show a positive relationship. The relationship between these variables is significant. This result indicates that GBS will positively impact DT in private universities. GBS plays an important role in driving digital transformation among HEIs. This scenario is related to the decentralization model adopted in the national education delivery system in Indonesia (Dewi, 2021), which allows HEIs autonomy in aspects of their organizational operations, but in aspects of standardized management, they remain dependent on mechanisms set by national education policies of the central government (Ruhimat et al., 2024).

In general, this research promotes the enhancement of ISS and DT through the enrichment of MC and GBS as a new alternative to improve the performance of PTS in

Indonesia. The results of this research are valuable because they offer a 'way out' for developing private university performance in Indonesia. Furthermore, other universities in various countries experiencing similar downturns, stagnation, or lags in university competition can adopt this approach.

Conclusion

There is a positive significance of MC on the performance of private universities, both directly and through ISS and DT. These findings emphasize that competent management can project the formulation and implementation of effective information technology strategies and drive the appropriate digital transformation processes. These two aspects then become intermediaries that also determine the success of the performance of private universities. In addition, the positive relationship between GBS and the performance of higher education institutions has also been identified. The relationship exists both directly and through ISS and DT. Thus, GBS provides instant benefits and strengthens digital capabilities, which in turn can sustainably improve the performance of private universities. This finding is promoted as a 'new alternative' that can be relied upon to address the challenge of low performance in private universities in Indonesia, which has not yet been resolved. In a broader scope of interpretation, these findings can be adopted by other universities in various countries worldwide that are experiencing similar downturns, stagnation, or lagging in the competition of university performance and world-class university rankings.

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