

Uncovering Key Capabilities for Sustainable Competitive Advantage of Private Universities through Sentiment Analysis and In-Depth Interviews

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Abstract. The landscape of higher education, particularly for private universities, is becoming increasingly competitive due to technological disruptions and changing student preferences. This study aims to address the declining enrollment and closure of private universities by comprehensively mapping public perceptions and identifying undiscovered capabilities for maintaining sustainable competitive advantage. By analyzing social media data using RoBERTa-based sentiment analysis and topic modeling, as well as conducting in-depth interviews with 17 private university leaders, this research uncovers the driving factors behind the negative public sentiment towards private universities. The concerns cluster around high costs, dissatisfaction, career uncertainty, reputation, and sociopolitical issues. The study reveals underexplored capabilities in management science, such as reputation enhancement, as crucial for future development. The findings contribute to the understanding of public perceptions and emphasize the need for reputation management in higher education, providing valuable insights for private universities to adapt their strategies and maintain competitiveness in this challenging environment.

Keywords: private universities, higher education, sustainable competitive advantage, sentiment analysis, topic modelling, latent dirichlet allocation, in-depth-interview.

1. Introduction

The rapid transformation of the economic landscape, accelerated by the widespread implementation and utilization of various artificial intelligence algorithms, has brought about significant changes in the higher education sector (Aristovnik et al., 2020; UNESCO, 2022). The complexity of the issue lies not only in determining the relevance of higher education outcomes in an era of swiftly changing industries but also in understanding how higher education institutions should be managed to maintain a sustainable competitive advantage (Fleming, 2021; Kinkorová, 2021; Kye et al., 2021).

Amidst a decline in the number of new students, there has been a shift in labor market demand towards skilled workers rather than merely higher education graduates (Chatterji et al., 2022). Furthermore, the widespread use of artificial intelligence-powered websites, such as ChatGPT, poses unique challenges to the urgency and existence of higher education, which has long been deeply rooted in society (Mhlanga, 2023; Snellman, 2015; Taecharungroj, 2023; Tlili et al., 2023). The increasing cost of tuition has not been accompanied by the willingness of governments and societies to pay (KPMG International, 2020). In the context of private higher education institutions, this becomes particularly difficult, as their operational financing relies entirely on students (Camilleri, 2019; Zhang et al., 2022).

Interestingly, these challenges have not been experienced uniformly across the globe. The number of higher education institutions worldwide continues to grow, except in Indonesia (UNESCO, 2022). As the fourth-largest country in terms of the number of higher education institutions globally (UNESCO, 2022), Indonesia has been striving in recent years to merge or close private campuses due to a considerable number of private institutions deemed to lack sustainable competitive advantages and possess low capabilities (Caeseria, 2021; Kasih, 2021)

Findings from studies that suggest that academic leadership, value co-creation capabilities, marketing capabilities, and innovation capabilities are determinants of achieving sustainable competitive advantage should be reassessed (Bashir & Javed, 2021; Husti & Mahyarni, 2019; E.-S. Lee, 2010; Lo & Tian, 2020; Nisha et al., 2022; Sun et al., 2022). As Thomas Kuhn (1962) demonstrated that theories can change when a paradigm shift occurs (S. Fuller, 2002), the formulation of higher education theories and strategies in the face of disruption should begin with a thorough problem analysis (Corley & Gioia, 2011). This is necessary due to the difficulties higher education institutions are currently experiencing as a result of disruption (KPMG International, 2020).

Thus far, several studies have endeavored to map the challenges faced by higher education institutions in the era of disruption. Through a literature review, it has been discovered that the appropriate utilization of technology, specifically the implementation of artificial intelligence, can promote the realization of customized and personalized learning experiences (Ahmad, 2019). Another study, conducted with a literature review approach, found that disruption is not necessarily a challenge for higher education institutions, as it can be harnessed to achieve sustained competitive advantage (Al-Imarah & Shields, 2019). Furthermore, Dillan and Fudholi (2022) analyzed Twitter text data regarding alternative forms of higher education for the future, yielding two key findings. First, the RoBERTa algorithm demonstrated strong performance in classifying negative, positive, and neutral sentiments from the conducted sentiment analysis. Second, the public sentiment on Twitter towards online learning, predicted to be the future of higher education, was predominantly positive (Dillan & Fudholi, 2022).

Previous research findings have indicated a gap that needs to be addressed to facilitate the attainment of sustained competitive advantage for higher education institutions. There is a lack of research demonstrating how the natural public response on the internet, combined with in-depth interviews, can reflect the challenges faced by higher education institutions in the era of disruption. In an era where digital communication is primarily conducted through social media, natural responses can be inferred to generate a more profound understanding (Alantari et al., 2022; Georgi, 2015; Romero-Silva & de Leeuw, 2021). However, text analysis on social media alone is insufficient for comprehensively explaining phenomena (Tang & Zhang, 2018). As this study aims to provide a comprehensive depiction of the challenges faced by higher education institutions, in-depth interviews

are necessary to validate and enrich the findings from social media text analysis (Creswell & Plano Clark, 2011). Additionally, no research has attempted to explain the growth gap of higher education institutions globally and in Indonesia.

Management sciences suggest that mapping problems is of utmost importance for strategy development (J. B. Barney & Clark, 2007). A thorough understanding of the issues encountered allows organizations to prioritize the internal capabilities that need to be developed to achieve sustained competitive advantage (J. Barney, 1991; J. B. Barney & Clark, 2007). The existing literature highlights the importance of various factors for achieving sustainable competitive advantage in higher education institutions but lacks a comprehensive understanding of the challenges they face based on public opinion on social media and in-depth interviews with higher education leaders. Furthermore, there is a gap in research attempting to explain the growth discrepancy between higher education institutions globally and in Indonesia. This study aims to fill this research gap by answering the central research question: based on public opinion on social media and in-depth interviews with higher education leaders, what capabilities should private higher education institutions develop to face disruption?

To achieve this goal, we employ a theoretical framework based on the resource-based theory and employ two concurrent methods to obtain a more comprehensive understanding in answering the research question and validating the findings (Creswell & Plano Clark, 2011). First, text analysis from digital conversations regarding higher education institutions globally and in Indonesia over the past decade was conducted using sentiment analysis and topic modeling. Second, in-depth interviews with 17 private university leaders in Indonesia were carried out to elucidate the challenges faced by their institutions and the strategies implemented to address these challenges. Subsequently, the emerging indicators from the text analysis were classified into latent variables within management science research. The outcomes of this study's analysis are expected to serve as the foundation for developing strategies to enhance the capabilities of private higher education institutions in emerging economies in pursuit of sustained competitive advantage.

2. Literature Review

2.1. Complexity of Private Higher Education Institution Management in Indonesia

Private higher education institutions in Indonesia are autonomously managed educational entities operated by non-profit foundations in both financial and non-financial aspects (Permendikbud No. 3, 2020; Permendikbud RI No. 7., 2020; PP No. 4., 2014). The Indonesian government recognizes that state-run public higher education institutions may not sufficiently accommodate the ideal educational needs of society (Law No. 12 of 2012 on Higher Education, 2012; Permendikbud RI No. 7., 2020). Although private higher education institutions operate independently without government funding, they are subject to government supervision and guidance to ensure the relevance of their graduates (Law No. 12 of 2012 on Higher Education, 2012, p. 12).

The expected relevance of graduates is the significance of the competencies acquired by private higher education institution alumni in promoting the nation's economic progress (Dirjen Pendidikan Tinggi, 2020). Private higher education institutions in Indonesia face a tension between meeting industry needs through higher education and fulfilling the ideal objective of higher education, which is to maximize human potential. To address this, private higher education institutions have implemented adjustments to maintain a sustainable competitive advantage (Grewal et al., 2022; Ruizan, 2020). Without such adaptations, it is believed that private higher education institutions may not endure, thus failing to achieve their ideal vision in education (Grewal et al., 2022; Ruizan, 2020).

In addition to navigating the tension between practical industry needs and ideal educational objectives, private higher education institutions in Indonesia also compete with public higher education institutions and foreign universities that have obtained operational permits in the country. For the Indonesian population, public higher education institutions and overseas universities are considered more promising and prestigious in the job market. To tackle these challenges, private higher education

institutions in Indonesia maximize their advantages, such as their ability to innovate and enhance the quality of their academic services. A logical implication of improving quality in private higher education institutions is an increase in tuition fees, which ultimately results in a narrow difference between the cost of attending prestigious foreign universities and that of private universities in Indonesia.

2.2. Sustainable Competitive Advantage and Internal Capabilities in the Perspective of Resource-Based Theory

This study uses the resource-based theory as its primary theoretical framework to understand how higher education institutions can achieve a sustainable competitive advantage amidst the disruption. Within the purview of the resource-based theory, Barney (1991) posited that to achieve sustainable competitive advantage, organizations need to utilize their valuable and rare resources. Organizational resources encompass capabilities, assets, organizational processes, attributes, knowledge, and information controlled by the organization. Any market changes can be effectively addressed by organizations if their capabilities are optimally employed (J. Barney, 1991; J. B. Barney & Clark, 2007).

This theory has also been implemented within the context of higher education governance. It has been found that higher education institutions in developing countries have successfully navigated globalization and established collaborations with other institutions to attain sustainable competitive advantage, primarily by maximizing their capabilities (Garland, 2019; Sanders & Wong, 2021; Tjahjadi et al., 2022). Additionally, big data analysis has been identified as a crucial resource to be harnessed in generating insights for formulating strategies aimed at achieving sustainable competitive advantage (Sekli & De La Vega, 2021; Yaakub et al., 2021). However, to date, there has been a dearth of research attempting to map issues for subsequent inference within the domain of management science. By applying the resource-based theory framework to the context of higher education institutions, this study seeks to provide insights into the capabilities these institutions should develop to achieve a sustainable competitive advantage in the era of disruption.

2.3. Sentiment Analysis using RoBERTa

A multitude of state-of-the-art algorithms excel in executing natural language processing tasks, such as sentiment analysis (Du et al., 2022). These include GPT, BERT, XLM, ELMo, and XLNet, which have demonstrated remarkable performance (Du et al., 2022). However, the necessity for substantial computing resources and the restrictions on tuning hinder researchers' ability to employ these algorithms (Du et al., 2022; Gruetzemacher & Paradise, 2022). Consequently, the RoBERTa algorithm emerged as a superior alternative, boasting enhanced performance and reduced computational demands (Dillan & Fudholi, 2022; Du et al., 2022; Liao et al., 2021). This algorithm is an adaptation of the BERT algorithm, with modifications as delineated by Liu et al. (2019), including retraining the model with larger data and batch sizes, eliminating the next sentence prediction objective, training on extended text sequences, and dynamically altering masking patterns in the training data. The researchers reported that the resultant model surpasses all post-BERT methods.

The RoBERTa algorithm has been implemented across diverse domains, including higher education, to analyze public sentiment. One instance is the application of the RoBERTa model to evaluate the Indonesian government's "Merdeka Belajar" higher education program, effectively categorizing text into positive, negative, and neutral sentiments (Dillan & Fudholi, 2022). Other studies, such as those by Ngoc, Thi & Thi (Ngoc et al., 2021) and Hu & Peng (Su & Peng, 2023) have employed the model to scrutinize student feedback on courses, offering valuable insights to stakeholders regarding the organization's course offerings. Despite being a recent algorithm with minimal computational requirements, RoBERTa remains underutilized, particularly in the analysis of sentiment trends within the broader landscape of general and private higher education sentiment analysis research. Moreover, the majority of sentiment analysis studies in higher education continue to concentrate on detecting and enhancing students' perspectives and reactions to specific experiences, policies, or programs (Baragash

& Aldowah, 2021; C. H. Yu et al., 2018; X. Yu et al., 2021) with the goal of ameliorating student experiences, rather than devising alternative strategies for improved management of higher education institutions. Consequently, this study represents the first to employ the RoBERTa algorithm in the analysis of private higher education sentiment trends over an extended period, with a focus on managerial perspectives, both globally and locally in Indonesia.

2.4. Topic Modeling with Latent-Dirichlet Allocation

Topic modeling is a sophisticated statistical technique that groups a corpus of documents or information into distinct themes, providing valuable insights into their semantic relationships (Kherwa & Bansal, 2019; Maier et al., 2018). This method enables the identification of topic proximity, facilitating the organization of documents or themes based on their semantic similarity (H. Lee & Kang, 2018). One of the most prevalent algorithms employed for topic modeling is Latent Dirichlet Allocation (LDA). Alternative approaches, such as Latent Semantic Indexing (LSI) and Latent Semantic Analysis (LSA), can also be utilized (Crain et al., 2012).

LDA has been implemented in various research domains for information clustering, including identifying research themes in Islamic economics (Ghulamallah et al., 2021), examining the repercussions of the COVID-19 pandemic through public complaints (Deng & Yang, 2021), and categorizing customer conversations on e-commerce platforms (Chunhasomboon & Phimoltares, 2022). In the context of higher education, LDA has been employed to uncover research trends concerning student experiences (Ouyang et al., 2022), assess opinions on university rankings (Balachandran & Kirupananda, 2017), and analyze student feedback on specific assignments or policies (Hussain et al., 2022). However, prior studies have not yet utilized LDA to explore topics derived from public opinion concerning higher education itself. Considering the extensive applications of LDA in previous research and given its status as the standard algorithm for topic modeling (Crain et al., 2012), this study contributes to the literature by implementing LDA to ascertain the principal themes emerging from the public's perspectives on private higher education.

3. Methodology

This study employs two methods. Firstly, a text analysis of tweets from the past decade (2011-2022) is conducted. The text analysis consists of two stages: sentiment analysis using the RoBERTa algorithm and topic modeling using Latent Dirichlet Allocation (LDA). The combination of these analyses aims to provide a comprehensive understanding of the text (Ahadi et al., 2022; Alantari et al., 2022). Sentiment analysis offers a general overview of public opinion expressions in tweets, whether positive, negative, or neutral; however, it cannot reveal the context or topics being discussed (Ahadi et al., 2022; Alzate et al., 2022). To complement this, topic modeling is performed to identify themes or topics within the text (Dillan & Fudholi, 2022; Tang & Zhang, 2018; Zhou & Ye, 2020). Secondly, the study conducts in-depth interviews to gain further insights. The interview results are also employed to provide insights beyond the findings of the text analysis from social media.

The concurrent methods are then inferred within the context of management science to determine the capabilities that private higher education institutions must develop to achieve sustainable competitive advantage (see Figure 1).

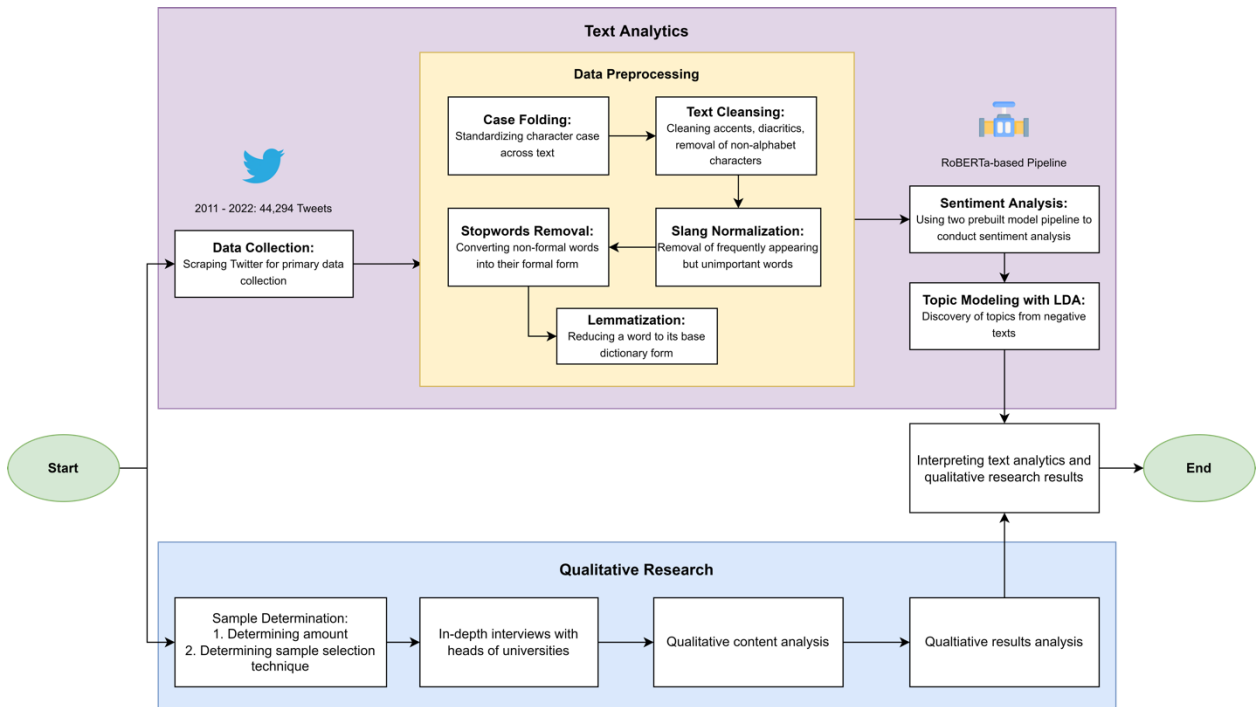


Fig. 1: Research methodology.

The study begins by collecting data on the Twitter social media platform using the sncscrape library and Python programming language. Data collection spans from 2011 to 2022, with a limitation of 1000 tweets per month in each year. The search terminology used for collecting global context tweets concerning private universities is "(private university) lang:en." An additional lang:en parameter is included in the global context search to ensure that the collected tweet data is in English, making the sentiment model and data processing techniques applicable to the collected data. For the local context, the search terminology used is "(*perguruan tinggi swasta* (private higher education) OR *universitas swasta* (private universities))" for private higher education institutions. Once the data is collected, the results are visualized to gain an overview of the data.

Several pretrained deep learning models are employed to analyze the collected text. For the Indonesian text data (collected for the local context), the Indonesian RoBERTa Base Sentiment Classifier model is used for sentiment analysis. This model is an extension of the Indonesian sentiment analysis RoBERTa model, trained on the OSCAR dataset and fine-tuned with the IndoNLU (Indonesian Natural Language Understanding) sentiment dataset. The model achieves 94.36% accuracy and an F1 macro score of 92.42%. Global context data is analyzed using the Twitter-roBERTa-base for Sentiment Analysis model, a RoBERTa model fine-tuned on 123.86 million tweets. Both models can label text as negative, neutral, or positive.

Before conducting further analysis, data preprocessing is necessary to ensure that only clean and essential information is used for analysis. This is achieved through the following steps (Arminditya Fajri Akbar et al., 2021):

a) Case folding

Case folding is a process where all characters in the text are converted to lowercase, standardizing content and ensuring equal weight is given to words with different cases (e.g. "Me" and "me").

b) Text cleansing

Text cleansing is a process that includes normalizing accents and diacritics (e.g., "cliché" to "cliche"), removing links, numbers, and non-Latin characters, ensuring model interpretability.

c) Slang normalization

Slang normalization refers to the process of transforming non-standard words into their standardized or canonical forms. For instance, the Indonesian slang word "gue" would be converted into its standard form, "aku" (which means me or I).

d) Stopwords removal

The elimination of stopwords—words that frequently appear in text but do not contribute to its meaning (e.g., "and," "not")—is also performed to facilitate analysis of the text's essence.

e) Lemmatization

The final stage of data preprocessing involves lemmatization, which reduces a word to its base form, or lemma, as found in a dictionary. This is achieved by establishing a mapping between the word and its base form. The process ensures that words with similar meanings, such as "mencoba" (trying) and "coba" (try) in Indonesian, are standardized to "coba" (try) preventing the model from treating them as distinct entities.

In addition to sentiment analysis, topic modeling analysis is conducted. The implementation of the Latent Dirichlet Allocation (LDA) algorithm is employed to identify discussion topics. To determine the hyperparameter values of alpha (topic density per document) and beta (topic density per word) in the LDA model, variational Bayesian inference will be utilized. The determination of the number of topics in the model will be based on coherence scores, employing the elbow-cutoff method. This method identifies the optimal number of topics as the parameter value at which the coherence score no longer increases. The elbow-cutoff method is further augmented with an early stopping mechanism, set at a value of 8. This means that if, for $K_i \dots K_j$, the coherence score does not increase for eight consecutive instances, the search for the optimal number of topics will cease, and the K value with the highest coherence score will be used. The LDA model is implemented using the Gensim library in Python.

To gain further insights into the challenges faced by private universities and the actions taken to address them, in-depth interviews were conducted with 17 leaders of private universities in Indonesia. These leaders were selected from universities accredited as Unggul (Excellent), A, Baik Sekali (Very Good), and B. Purposive sampling and snowball sampling approaches were utilized to capture diverse perspectives from university leaders. The interviews were conducted online between September 2022 and March 2023 (see the profile of the sources in Table 1).

Table 1: Profile of Informants.

Characteristic	Total
<u>Sex</u>	
Male	13
Female	4
<u>Age Range</u>	
35-40 years	1
41-45 years	2
46-50 years	3
51-55 years	4
> 55 years	7
<u>Position</u>	
Rector	7
Vice Rector	10
<u>Qualification</u>	
Master	2

Characteristic	Total
PhD/Dr	13
Professor	2
<u>Accreditation</u>	
A	2
B	11
Unggul (Excellent)	2
Baik Sekali (Very Good)	2

The interview protocol included the following questions:

- 1) What are the challenges faced by the university that you lead?
- 2) What approaches have been taken to address these challenges?

The interview responses were transcribed verbatim, and thematic analysis was employed to identify key challenges, actions taken, and developed capabilities. The findings from the in-depth interviews were then compared with the results of sentiment analysis and topic modeling to provide a comprehensive understanding of the challenges faced by private universities in Indonesia and the necessary capabilities required for sustainable competitive advantage.

4. Results

4.1. Descriptive Analytics

In total, this study has collected 44,294 thousand tweets from January 1, 2011, to December 31, 2022, for each research theme (see Figure 2). At a glance, it can be observed that for private higher education institutions, the number of tweets has increased significantly.

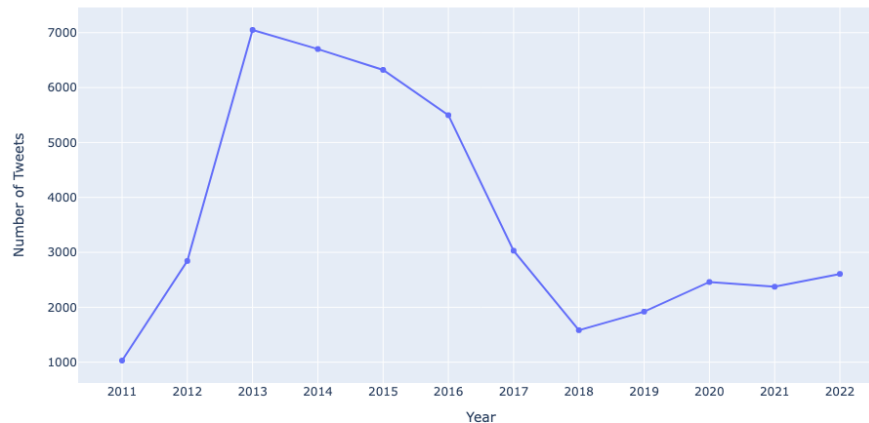


Fig. 2: Annual Tweet Volume from 2011 to 2022.

Figure 2 shows that during the last decade, the total number of Tweets on private universities were found to be the highest in 2013 then continued to decline until 2018. This finding is in line with the trends of the search term “Twitter” on Google Indonesia. This pattern of Twitter and Google search trend peaks in 2013 may be explained by the growth in use of smartphones and development of internet connectivity in Indonesia in the early 2010s (Carley et al., 2015; Degenhard, 2023). The Tweets gathered from 2011 to 2022 will be analyzed using sentiment analysis and topic modelling.

4.2. Social Media Text Analysis

Sentiments on Twitter toward private higher education institutions in Indonesia are predominantly neutral and negative. Since 2017, sentiments about private higher education in Indonesia have significantly shifted from being predominantly neutral to negative (see Figure 3).

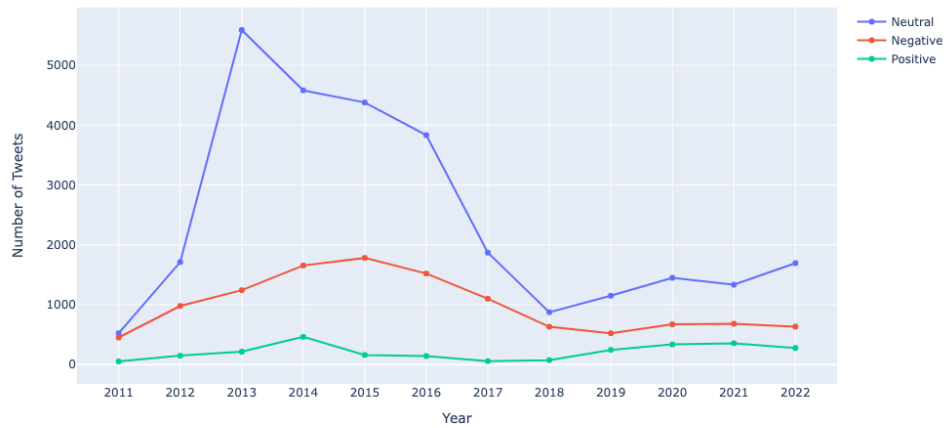


Fig. 3: Sentiment Trends over the Last 11 Years.

The significant sentiment shift illustrated in Figure 3 provides a general overview of the crisis faced by private higher education institutions in Indonesia. Without substantial reform, the sustainability of these institutions is under threat. It is unsurprising that the government has implemented prompt interventions, such as closing or merging private higher education institutions in Indonesia, to ensure the quality of academic services for the community is maintained (Kasih, 2021).

Given the substantial increase in negative sentiment trends, this study proceeds to analyze the text of each tweet classified under negative sentiment. Through hyperparameter tuning based on the coherence score of the model for varying values of K , five topics were found to be the optimal number of topics for tweets with this sentiment, with a coherence score of 0.46 (see Figure 4). Coherence scores evaluate the semantic similarity of the most relevant words within a topic, with higher scores indicating more coherent topics. While coherence scores can vary depending on the dataset, a score of 0.46 was deemed acceptable for this study, as it yielded well-separated topics without overfitting the data. Alternative methods for determining the optimal number of topics, such as perplexity or cross-validation, were considered, but the coherence score was chosen for its intuitive interpretation and ability to account for human interpretability (Lee et al., 2021; Mifrah and Benlahmar, 2020).

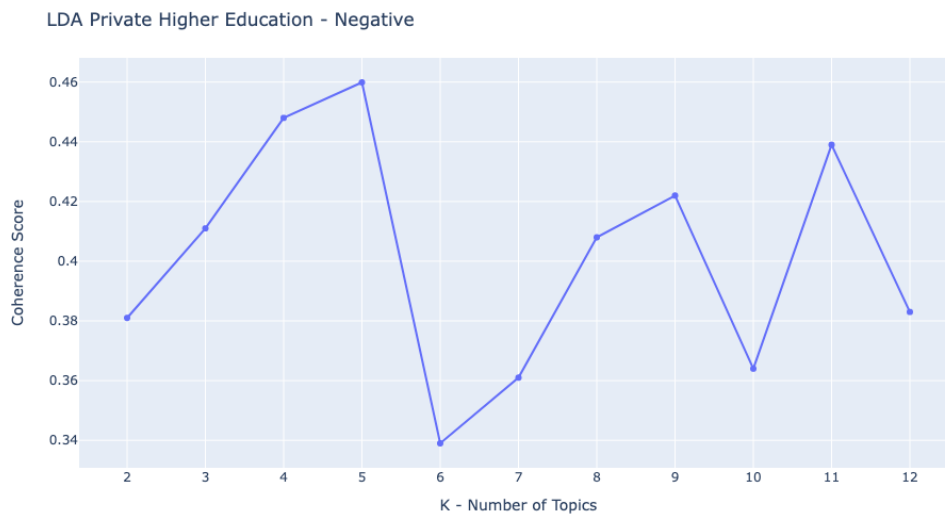


Fig. 4: Coherence Scores for Varying Number of Topics for Negative Tweets.

Furthermore, visualizing the topic modeling results in the form of an intertopic distance map with five as the number of topics, it can be seen that each topic is well segregated (see Figure 5). The intertopic distances were calculated using the Jensen-Shannon divergence, a measure of similarity between probability distributions, which provides a more informative representation of topic relationships compared to the raw topic-word distributions. The visualization was created using t-distributed Stochastic Neighbor Embedding (t-SNE), a dimensionality reduction technique that preserves the pairwise distances between topics in a two-dimensional space. As a result, the negative tweets are divided into five well-separated and interpretable topics (see Table 2) (Bahja and Safdar, 2020; Sievert and Shirley, 2014).

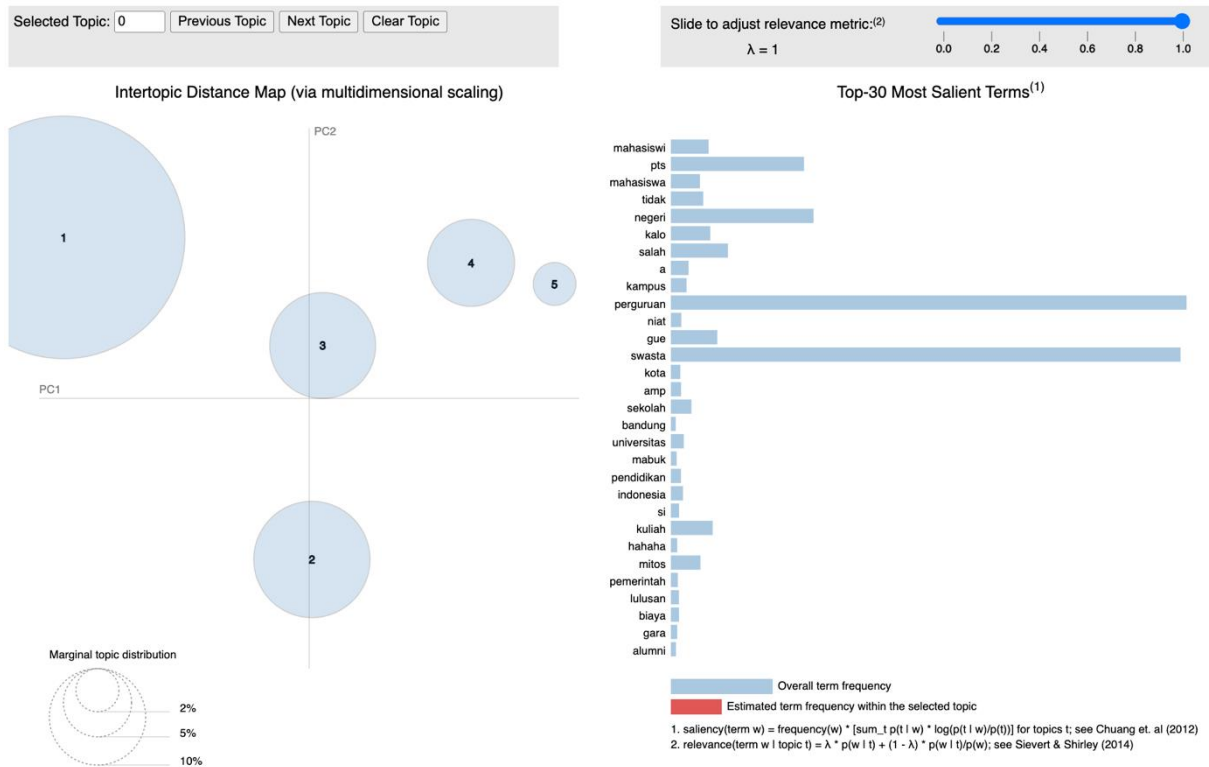


Fig. 5: Intertopic Distance Map for Negative Tweets.

Table 2: Dominant Topics found in Tweets on Private Higher Education Institutions with Negative Sentiments.

Topic	Label of topic	Words representing topic
1	High cost and financial concerns	cost, money, expensive, payment, tuition, funds
2	Dissatisfaction	regret, panic, fake, confusion
3	Graduation and career uncertainty	graduation, major, confusion, transfer, work, enrollment, unemployment, credit transfer

Topic	Label of topic	Words representing topic
4	Poor reputation	illegal, demeaning, sudden, loss, rejection
5	Sociopolitical issues	radicalism, wrong, myth, pessimistic, politics, doctrine

Observing Table 2, there is a connection among the topics. These topics explain the phenomenon of a significant increase in tuition fees since 2017, coupled with the public's push for enhancing the quality of private higher education institutions in Indonesia. Unfortunately, the fee increase is not accompanied by student and community satisfaction, nor by satisfaction from the business and industrial sectors. Consequently, graduates from private higher education institutions struggle to find employment. Additionally, private universities in Indonesia are perceived as having poor reputations due to unethical practices such as lacking operational permits, not being accredited, and seemingly prioritizing profit over their students' welfare. Radicalism and political issues are also often associated with private universities.

Five topics identified in tweets classified as negative sentiment have provided crucial points for private universities to address. However, information on the positive aspects of private universities has not been examined. Such information is vital for determining what needs to be done in response to negative sentiment and whether negative sentiment correlates with negative outcomes. Therefore, this study conducted topic modeling for tweets classified as positive sentiment. Similar to the previous process of discovering the optimal number of topics for negative-labeled tweets, hyperparameter tuning was also done for positive-labeled tweets. Five topics were also found to be the optimal number of topics for tweets with this sentiment, with a coherence score of 0.56 (see Figure 6). The intertopic distance map visualization shown in Figure 7 also shows that each topic is segregated, indicating the produce of distinct and non-overlapping topics. Therefore, five topics were also used to analyze tweets classified as positive sentiment (see Table 3).

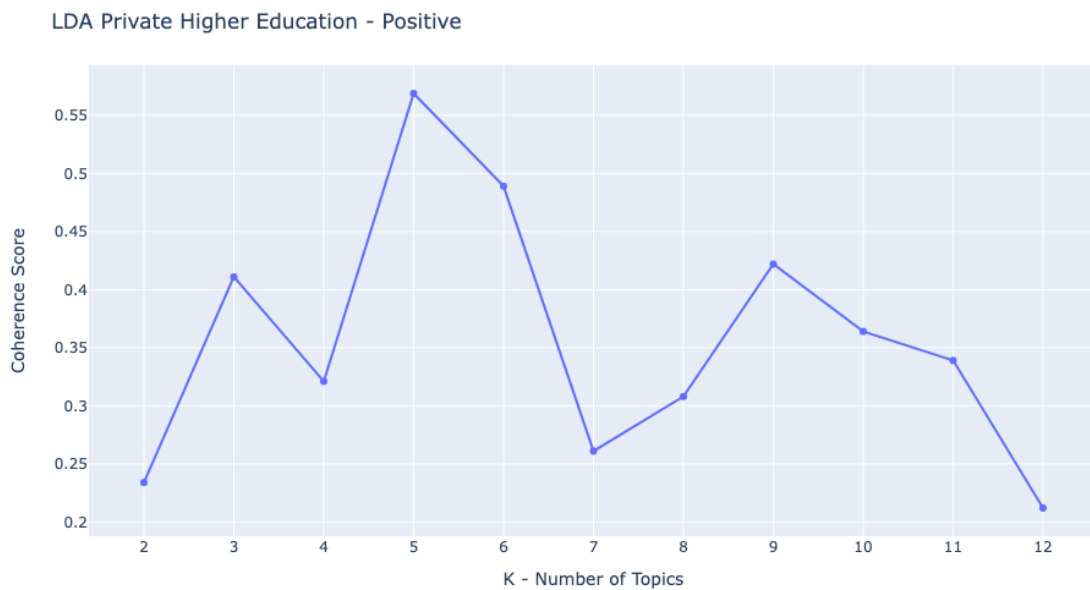


Fig. 6: Coherence Scores for Varying Number of Topics for Positive Tweets.

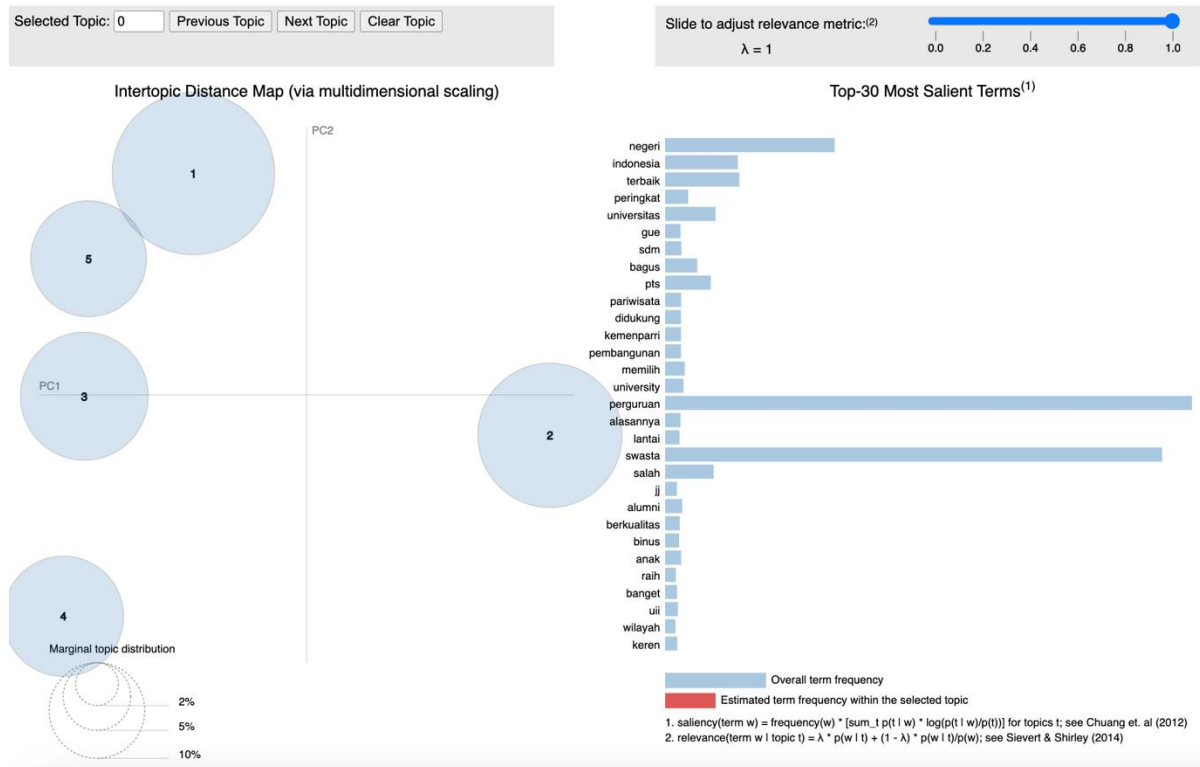


Fig. 7: Intertopic Distance Map for Positive Tweets.

Table 3: Dominant Topics found in Tweets on Private Higher Education Institutions with Positive Sentiments.

Topic	Label of topic	Words representing topic
1	High cost and financial concerns	cost, money, expensive, payment, tuition, funds
2	Dissatisfaction	regret, panic, fake, confusion
3	Graduation and career uncertainty	graduation, major, confusion, transfer, work, enrollment, unemployment, credit transfer
4	Poor reputation	illegal, demeaning, sudden, loss, rejection
5	Sociopolitical issues	radicalism, wrong, myth, pessimistic, politics, doctrine

Table 3 suggests that private universities in Indonesia are perceived to have positive sentiment regarding various leadership initiatives undertaken by private university leaders. There is a significant opportunity for collaboration, and marketing activities are viewed positively by social media users. This

perception is confirmed by the fact that private universities are more aggressive and proactive in offering competitive prices and building a favorable image through creative advertising methods compared to public universities. This can be understood as a consequence of the positive public response to public universities. Therefore, even without marketing activities, public universities will still be sought after. In contrast, private universities are required to be more active in informing the public about their academic services to attract prospective students and instill pride in current students. Private universities are also perceived as more innovative and flexible in implementing learning. The thinner bureaucracy in private universities allows for easier decision-making in response to the highly dynamic market to maintain a competitive advantage.

Considering the text analysis results obtained through sentiment analysis and topic modeling, it was found that several actions need to be taken by private universities in response to the text analysis findings. The required actions are clustered into capabilities that private universities need to develop (see Table 4).

Table 4: Suggestion of Capabilities to be developed by Universities based on Text Analysis Findings.

Findings from text analysis on private higher education institutions	Actions that need to be taken by universities	Capabilities developed by universities
Positive sentiment towards leadership and collaboration, but negative sentiment towards financing, dissatisfaction, and sociopolitical issues.	Resolve existing problems in various ways, adhere to ethical standards in decision-making, build relationships with external communities, and involve stakeholders in collaborative decision-making processes for academic service products, financing, and fulfilling stakeholder needs.	Academic leadership, value co-creation capability, marketing capability.
Innovation, marketing, and digitalization in private higher education institutions have positive sentiment, but their reputation is perceived as subpar, financing is seen as inadequate, and graduates struggle to enter the job market.	Collaborate with businesses and industries to develop curricula in line with industry needs, evaluate appropriate pricing and devise pricing tactics.	Value co-creation capability, improving IT maturity level for better governance, marketing capability, innovation capability, capability to maintain and build existing reputation.
Innovation, marketing, collaboration, digitalization, and leadership have positive sentiment, but reputation is subpar.	Communicate the university's true identity to all stakeholders to ensure that all actions align with the university's identity.	Capability to maintain and build existing reputation.

Upon examining the indicators for various constructs in management science, it becomes evident that academic leadership (Hungund et al., 2022), value co-creation capabilities (Karpen et al., 2012), marketing capabilities (Dutta et al., 1999), innovation capabilities (Lawson and Samson, 2001), and the ability to maintain and build upon existing reputation are essential capabilities that need to be developed in response to the challenges faced by private universities in Indonesia. This study's in-depth interviews reveal the urgency of devising a new construct that can explain the universities' capabilities in preserving and enhancing their existing reputation. This construct has not yet been clarified within the reputation orientation framework proposed by Goldring (2015) and the reputation management capabilities suggested by Heugens et al. (2004) (Goldring, 2015, 2011; Heugens et al., 2004). Unfortunately, no construct in management science has been found to explain the capabilities for

maintaining and building upon existing reputation within the context of higher education governance, although this study's findings indicate the urgency of its formation for private university governance to create sustainable competitive advantages.

4.3. In-Depth Interviews

In-depth interviews were conducted with 17 leaders of private universities accredited as *Unggul* (Excellent), A, *Baik Sekali* (Very Good), and B to uncover new insights into the challenges faced by private universities. The selection of these accreditation types was based on the fundamental assumption that these universities already possess sustainable competitive advantages compared to those accredited as C or those without accreditation. Purposive sampling and snowball sampling approaches were utilized in this study to capture diverse perspectives from university leaders. The interview results revealed that private universities in Indonesia face serious challenges that are being addressed through various internal capabilities (see Table 5).

Table 5: Analysis of Interviews.

Challenges faced by private universities	Actions taken to overcome challenges	Developed capabilities
Resource constraints, including limitations in human resources, infrastructure, and financial resources.	Maximizing the utilization of all available resources and exemplifying academic leadership in the management and execution of work programs to ensure sustainability.	Academic leadership
Rapid changes in labor market demands. Students educated today with curricula developed in collaboration with business and industry partners may not necessarily be relevant to the needs of businesses and industries four years later.	Building the university's reputation through several approaches. First, aligning the actions and behaviors of all stakeholders with the university's identity. Second, accommodating the needs of all stakeholders while remaining within the confines of the university's identity. Third, effectively communicating the university's unique differences and spirit to the public. Additionally, continuously creating, communicating, and co-creating value with stakeholders and providing sustainable value to them.	Marketing capabilities, value co-creation capabilities, innovation capabilities, and the ability to maintain and build upon the existing reputation.
Regulatory changes by the government regarding higher education institutions. On the one hand, private universities must comply with all regulations; on the other hand, their resources may be inadequate for adapting to all regulatory changes.	Establishing a culture of innovation, encompassing the university's ability to generate new ideas and concepts that influence the development of novel academic services and processes.	Innovation capabilities.

Given the indicators within various constructs in management science, it is apparent that academic leadership (Hungund et al., 2022), value co-creation capability (Karpen et al., 2012), marketing capability (Dutta et al., 1999), innovation capability (Lawson and Samson, 2001), and the ability to manage, maintain, and build upon existing reputation are essential capabilities that need to be developed to respond to the challenges faced by private universities in Indonesia. Findings from in-depth interviews in this study highlight the urgency of constructing a new framework that can elucidate the

capabilities possessed by universities to maintain and enhance their existing reputations. Such a construct has not yet been explained within the reputation orientation construct proposed by Goldring (2015) or the reputation management capability put forward by Heugens et al. (2004) (Goldring, 2015, 2011; Heugens et al., 2004).

4.4. Comparison of Text Analysis and In-Depth Interview Results

Although both text analysis of social media content and in-depth interviews reveal what capabilities need to be developed by private universities during disruption, their outcomes differ. Text analysis of social media content yields sentiment classifications and topics related to negative and positive sentiments. Conversely, in-depth interviews provide explanations about various challenges faced by private universities in Indonesia and the actions taken to address these challenges. As these two methods were conducted concurrently, their results need to be compared (see Table 6).

Table 6: Comparison of Results from Text Analysis and In-Depth Interviews.

Private universities' issues		
Findings from social media text analysis	Findings from in-depth interviews	Results
There is a positive sentiment towards leadership and collaboration; however, negative sentiments exist regarding funding, dissatisfaction, and socio-political issues.	Resource constraints are a significant challenge, including limitations in human resources, infrastructure, and financial capacity.	Findings complement each other
In private higher education institutions, innovation, marketing, and digitalization are met with positive sentiment. Nevertheless, these institutions grapple with a perceived inferior reputation, funding that is deemed insufficient, and graduates who face difficulties in securing employment in the job market.	<ul style="list-style-type: none"> a. The rapid pace of changes in labor market demands poses a challenge for higher education. Students educated today with curricula developed in collaboration with business and industry partners may not possess skills that remain relevant in the labor market four years from now. b. The changing regulations from the government concerning higher education also play a role. On one hand, private universities must comply with all regulations, but on the other hand, their resources are often inadequate to keep pace with these regulatory changes. 	Findings complement each other

The analysis of texts and in-depth interviews presented in Table 6 reveal that all findings are mutually explanatory. However, it should be noted that the challenges identified in the text analysis represent aggregate challenges, neglecting the accreditation of the universities discussed. These results may not adequately represent the issues within the sample of research informants, which includes leaders of universities accredited as *Unggul* (Excellent), *A*, *Baik Sekali* (Very Good), and *B*; however, it is still possible that these challenges occur at varying degrees within each university.

5. Discussion

This study's findings highlight several distinct challenges faced by private higher education institutions in Indonesia. The implications of these findings suggest that private higher education institutions must develop appropriate strategies, taking into account their universities' capabilities. The results indicate

that academic leadership, value co-creation capabilities, marketing capabilities, innovation capabilities, and digitalization are no longer intuitively sufficient to influence the creation of sustainable competitive advantage. This study questions the relevance of previous research findings, which suggest that academic leadership, value co-creation capabilities, marketing capabilities, and innovation capabilities significantly influence sustainable competitive advantage (J. Barney, 1991; Bennett, 1988; Dutta et al., 1999; Fuchs et al., 2000; Hungund et al., 2022; Karpen et al., 2012; Lawson & Samson, 2001; Vargo & Lusch, 2018).

The strengths of this study include the use of both sentiment analysis of social media data and in-depth interviews to gain a comprehensive understanding of the challenges faced by private universities in Indonesia. This approach has allowed for the triangulation of findings and the identification of key issues that need to be addressed. However, there are some limitations to this study. One limitation is the use of aggregated data from social media, which may not accurately represent the sentiment towards specific universities. Additionally, the pretrained text analysis models used in this study may have inherent biases, which could affect the results as well as the interpretation of it.

The implication is that the challenges faced by higher education institutions during this disruptive era cannot be addressed solely through the use of information technology (Alach, 2017; Ragowsky et al., 2012). Nor can these challenges be overcome merely through collaboration with industry, advertising, or by implementing innovative learning approaches (Alrajhi & Aydin, 2019; Chatterji et al., 2022; Marinho et al., 2020). Additional internal capabilities are needed to bridge the limitations of academic leadership, value co-creation capabilities, marketing capabilities, and innovation capabilities in order to achieve sustainable competitive advantage. This study suggests that the capability in question is the ability to maintain and build upon an institution's existing reputation.

The practical implications of this study are that private higher education institutions should prioritize reputation management as a means of fostering more positive sentiment and achieving sustainable competitive advantage. This may involve developing strategies to communicate and embody the university's identity to stakeholders, regularly assessing stakeholder needs, and ensuring that actions align with the university's image. For future research, it would be valuable to investigate the impact of accreditation levels on public sentiment, as well as to develop and test new constructs for understanding reputation management within the context of higher education.

Within the marketization of education, where education is focused on fulfilling specific market needs, a university's reputation plays a critical role (Angulo-Ruiz et al., 2022; Aula & Tienari, 2011). Conceptually, marketing capabilities, academic leadership, value co-creation capabilities, and innovation capabilities influence reputation (Angulo-Ruiz et al., 2016; Aula & Tienari, 2011; Christensen & Gornitzka, 2017). Based on the text analysis and in-depth interviews conducted in this study, as well as considering Goldring's (2015) and Heugens et al.'s (2004) research, it was found that maintaining and building reputation requires communication and embodiment of the university's identity to stakeholders, regular assessment of stakeholder needs, refraining from actions contradictory to the university's identity, consistently acting in accordance with the university's image, and ensuring that everyone within the university is aware of common objectives. This approach ensures that the university's portrayal in the media aligns with its identity (Goldring, 2015; Heugens et al., 2004). By focusing on the development of reputation management capabilities, private higher education institutions can foster more positive sentiment and promote the achievement of sustainable competitive advantage amid ongoing disruption.

6. Conclusion

Sentiment analysis using pre-built RoBERTa-based models and topic modeling with Latent Dirichlet Allocation (LDA) have been conducted on public opinions concerning private universities in Indonesia. Disregarding neutral sentiments, it was found that the sentiment analysis trend over the last decade has been dominated by negative sentiments. There are five topic clusters in Tweets classified under negative

sentiments and five topic clusters in Tweets classified under positive sentiments. The findings from the text analysis of social media data corroborate the results obtained from in-depth interviews. The primary issue faced by private universities in Indonesia is the limitation of university resources, leading to increased tuition fees and a decline in quality. This issue has fostered negative sentiment on topics such as high costs, financial concerns, and dissatisfaction. Furthermore, private universities struggle to respond to the challenges posed by regulatory changes and the rapidly shifting labor market demands to produce graduates relevant to industry needs. This is confirmed by topics on graduation and career uncertainty and socio-political issues in the output of topic modeling of Tweets classified as negative sentiments.

In addition to private universities in Indonesia and countries with similar characteristics, this issue mapping has significant implications for the higher education sector as a whole. The research findings generally elucidate the risks when universities fail to maintain and shape their reputations. Society no longer perceives universities as the sole path to obtain decent employment, welfare, or as a vehicle for social mobility. Changes in industry demand have become one of the drivers (Dužević, et al., 2017; J. B. Fuller et al., 2022). Consequently, it is not surprising that young people in Indonesia even refuse scholarships offered by ministers (Handayani, 2022).

Nonetheless, although this study has demonstrated the effectiveness of implementing text analysis from social media and in-depth interviews in generating issue mapping, the findings from social media text analysis are derived from aggregated data. This aggregated text does not yet reflect public sentiment towards private universities with specific characteristics examined in this study, such as those with "Unggul (Excellent)," "A," "Baik Sekali (Very Good)," and "B" accreditation. Therefore, further development of text analysis models for better text separation is necessary. Additionally, this study found that universities' capabilities to maintain and develop their reputations cannot be adequately explained within current management science constructs. As a result, the formulation of new constructs is required and should be tested to discover the most suitable model for building sustainable competitive advantage.

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