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Market Exploration of MOOC Provider Companies in Indonesia Using Machine Learning

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Abstract—This research aims to explore the market of MOOC (Massive Open Online Course) platform providers in Indonesia using machine learning methods to analyse trends and user behaviour. MOOCs provide broad access to education, especially during the pandemic, where the need for learning flexibility increases. Although machine learning applications have been widely applied in the financial sector, their application in the exploration of the education market, particularly MOOCs, is still minimal. This research aims to address this gap by applying machine learning algorithms, such as clustering and decision trees, to understand user preferences and predict future needs. The study found that Duolingo leads the MOOC market in Indonesia with a 79.76% share. Although the market is dominated by a few big players, there are growth opportunities for new platforms through innovation and proper segmentation. This research also shows the importance of applying AI technology in processing big data to understand market dynamics more comprehensively.

Keywords: *market exploration; MOOC; machine learning*

INTRODUCTION

The development of digital technology cuts across the boundaries of time and space. The presence of learning technologies such as MOOCs plays an extraordinary role in the dissemination of knowledge. Certified online education or training providers in the form of MOOCs are growing rapidly in Indonesia. The growth of the Massive Open Online Course (MOOC) platform in Indonesia is influenced by the increasing access to digital technology and the need for more inclusive education. MOOCs allow anyone, from various social and economic backgrounds, to access educational content for free. The increasing use of MOOCs in Indonesia is also in line with the growing popularity of online learning due to the pandemic and the need for flexibility in the learning process. In this context, MOOC service providers face the challenge of understanding market needs as well as dynamic user behaviour.

Much of the research on the application of machine learning in Indonesia has focused on the financial sector, such as predicting stock prices or analysing company performance on the stock exchange. For example, research by Mistry reveals the use of modern Search Engine Optimisation using machine learning. (Ju et al., n.d.). Another study by Ramadhan et al. (2017) used an Artificial Neural Network (ANN) to predict the financial performance of companies on the Indonesia Stock Exchange. The research shows that machine learning has the ability to accurately predict market and financial behaviour. (Ramadhan et al., 2017). Although the application of machine learning in the financial sector is growing rapidly, research related to its application for education market analysis, especially for MOOCs in Indonesia, is still very little explored.

A lot of MOOC research has been conducted. We found at least 200 Scopus articles from 2014 to 2024 that generally discuss performance analysis, emotions and user experience, MOOC design and effectiveness, sentiment analysis, and linkages with new technologies. Most of the existing research still focuses on the pedagogical aspects of MOOCs, such as curriculum design and challenges faced by instructors, especially in Indonesia and Malaysia (Sari, 2020). The research is generally more directed towards how MOOCs are designed, how participant engagement is enhanced, and how design challenges can be overcome. This shows that research in this area still focuses on the course design aspect, while market exploration and user data analysis using machine learning methods have not been widely discussed.

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Competition in the Indonesian MOOC market is becoming increasingly fierce, driven by technological innovation, product specialization, and the role of the government. However, specific research on MOOC competition is still minimal, leaving ample opportunity for further research, particularly regarding the impact of AI and local platform strategies in countering the dominance of global players. We have not found any market research on MOOCs that takes the cyberspace community as users. We also highlight two things: *firstly*, the lack of machine learning integration in MOOC market exploration. While MOOCs are growing in popularity, there is still a gap in the application of AI and machine learning technologies to understand the dynamics of this market in depth. (Peters et al., 2015). *Secondly*, most studies focus on MOOC infrastructure and adoption, without integrating advanced tools such as machine learning for market exploration and trend prediction. Absence of a holistic, data-driven approach: Most studies have not adopted a data-driven approach that utilises AI holistically to process big data from MOOC users. (Rhoda Adura Adeleye et al., 2024)

This research will incorporate the use of AI and machine learning to analyze patterns and trends in MOOC usage across different global markets. This includes user segmentation based on learning preferences, analysis of user preferences, and prediction of future needs. The uniqueness of this research is the dynamic application of machine learning algorithms to explore how the MOOC market is developing in various countries, especially Indonesia.

LITERATURE REVIEW

Online Course Marketplace

MOOCs provide an additional resource for applicants in the job queue, although their labor market value is still modest and only equivalent to formal education qualifications. MOOCs are regarded as "soft credentials" that are accessible and flexible educational tools. Learners are aware of the low status of MOOC certificates and the lack of recognition, yet most of them have downloaded the free certificates issued at the end of the course, put them on their CVs, or linked them to their profiles on professional social networks. The authors argue that the increasing reliance on this type of training may contribute to a further transfer of responsibility from collective actors to individual workers (Goglio et al., 2023). Various MOOC business patterns in the market are now starting to diversify, ranging from subcontractors, freemium, and certification fees. MOOCs do not replace the classic role in higher education, but can be one of the important transformations in the world of education (Belleflamme et al., 2014).

MOOC Market

MOOCs have undergone significant development since they were introduced in 2008 by Siemens and Downes. A massive surge occurred in 2017, which reached almost 10,000 MOOCs in the world. MOOC participants have also reached more than 81 million users. Several giant platforms, such as Coursera, edX, and Udacity, from America dominate the market. Then XuetangX appeared in China and several other countries. The MOOC market has been divided into global and domestic markets. The global market involves universities and institutions from different countries that offer courses in different languages, while the domestic market is limited to courses in national languages (Semenova et al., 2018). The market for MOOCs has a tremendous impact on the community in the selection of higher education institutions. MOOCs can be a good image for an institution to be better known (Howarth et al., 2017).

MOOC (Massive Open Online Courses)

MOOCs are a series of online courses with some key characteristics. Note that they are all delivered online through video chat forums or a combination of both. Individuals in the field often

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develop courses at large research institutions; however, anyone can upload a MOOC. There is no registration fee for participants and no company to sign up, even if users are eligible. McCauley says, "MOOCs are social network integrations that facilitate the gathering of renowned experts in the learning field with free access to online resources." (Alario-Hoyos et al., 2017; Hoy, 2014)

MOOC is an open e-learning model with active user participation, and the number of users can be very large. In general, the materials available in this service are (Baturay, 2015) :

a. Video Learning This video contains documentary content that is approximately 5 to 10 minutes long
b. Reading. The suggested readings are quite varied. Some are presented as e-books and others as PPTs.
c. Question-scoring sheet. The questions are often in multiple-choice format, so scores are automatically displayed on the web.
d. Video Conferencing. This feature allows users to communicate in real-time with instructors through video calls.
e. Social networking. MOOC sites are often associated with social networks. So that it can support programme delivery.
f. Forum. The forum is a place for discussion with teachers and other MOOC users.

MOOCs have the potential to bring education to millions of people who might not otherwise have access to it. The combination of short video lectures, regular comprehension tests, and active participation in an online community can be an effective learning tool for some users.

METHODOLOGY

This research uses a web analysis method with the help of a web analysis tool (Semrush). Semrush provides facilities for users to perform analysis on keywords. (Richard & Ilham, 2024; Sudhakar et al., 2019). In this research, we collected data from MOOC platforms in Indonesia. We included at least 30 MOOC domains, among them:

Table 1. MOOC domains in Indonesia are managed by companies

No.	MOOC Name	Link
1	Skill Academy	http://skillacademy.com
2	Qubisa	http://qubisa.com
3	Binar Academy	http://binaracademy.com
4	CodeI	http://codesaya.com
5	School Coding	http://sekolahkoding.com
6	Duolingo	http://duolingo.com
7	Digit Talent	http://kominfo.go.id
8	DQLab	http://dqlab.com
9	Revou	http://revou.co
10	Cakap	http://cakap.com
11	Universitas Terbuka	http://ut.ac.id
12	My Skill	http://myskill.id
13	Arkademi	http://arkademi.com
14	Eduwork	http://eduwork.id
15	Future Skills	http://futureskills.id
16	Idebiz	http://idebiz.id
17	Interskill	http://interskill.id
18	Innovative Teacher	http://guruinovatif.id
19	Eduparx	http://eduparx.id
20	Online Training	http://diklat.online

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21	Digit Academy	http://digitademy.com
22	Kuncie	http://kuncie.com
23	Pilar Teknotama	http://pilarteknotama.co.id
24	Bright Share Class	http://kelasberbagicerah.com
25	Campus Digital	http://campusdigital.id
26	Al Hikmah Academy	http://alhikmahakademi.com
27	IT box	http://itbox.id
28	Mikkha	http://mikkha.com
29	E-Teacher	http://e-guru.id
30	Akupintar	http://akupintar.id

Based on this data, we conduct an exportation with the Application of Machine Learning: Machine learning algorithms, such as clustering, decision trees, or neural networks, will be used to analyse market patterns and trends. (Adeleye et al., 2024). These algorithms can help better predict and segment users.

RESULT

We include data on at least 29 MOOC companies currently in Indonesia. Figure 1 provides an overview of the dominance of major players in the MOOC market in Indonesia, as well as information on market size and market traffic trends over the period.

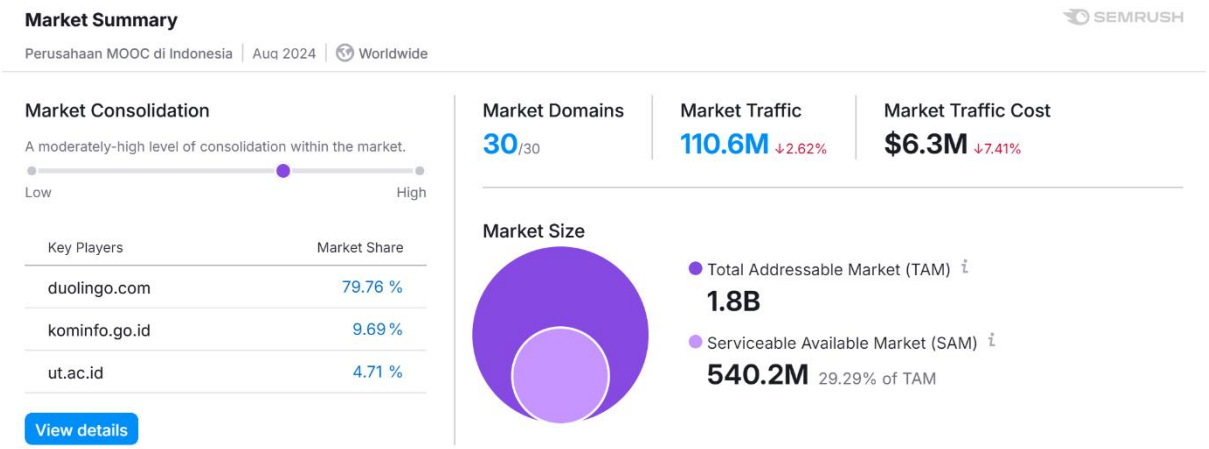

Figure 1. Market Summary of MOOC companies

The MOOC market in Indonesia shows a high degree of consolidation, which means that the market is dominated by a few large players. Key Players: Duolingo.com has the largest market share with 79.76%. Kominfo.go.id comes second with 9.69% market share. Ut.ac.id (Universitas Terbuka) comes in third with 4.71% market share. In terms of Market Domains, there are 30/30 market domains registered, indicating that there are 30 major players in the industry. Market traffic reached 110.6 million with a decrease of 2.62% compared to the previous period. Market Traffic Cost: The market traffic cost was $6.3 million, also a decrease of 7.41%. The market size from our search results showed a Total Addressable Market (TAM) of 1.8 billion. The Serviceable Available Market (SAM), which is the portion of the TAM that is practically reachable, is 540.2 million, or 29.29% of the total addressable market.

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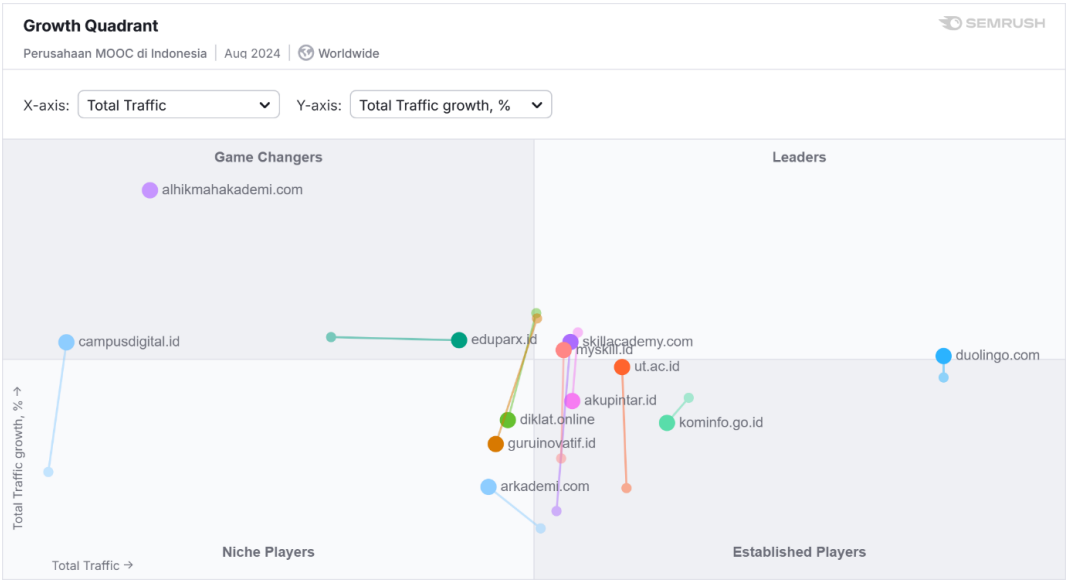

Figure 2. Growth Quadrant of MOOC companies

Figure 2 is divided into four main quadrants that show the company's position based on traffic growth (%) on the Y-axis and total traffic on the X-axis. A description and discussion of each section follows:

1. Leaders Quadrant

This quadrant features companies that have a large amount of total traffic and significant growth. In this quadrant is *duolingo.com*, which is deep in the bottom right corner. This shows that Duolingo is an established platform with very high traffic, despite relatively low growth. This reflects that Duolingo is a large, mature player in the MOOC market in Indonesia. This is consistent with research showing that only six popular platforms from 2017 to 2019 exhibited a concentrated market with limited rapid expansion among major players. This resulted in high traffic but slow growth (Lubis et al., 2020).

2. Established Players Quadrant

Companies in this quadrant have large total traffic but slow or almost stagnant growth. Here, we see sites like:

a. *ut.ac.id* (Universitas Terbuka) with large traffic but moderate growth.
b. *myskill.id*, *skillacademy.com*, and *akupintar.id* show a fairly competitive position with significant traffic but less aggressive growth. This reflects that these companies already have a strong market share but face challenges in maintaining rapid growth.

3. Game Changers Quadrant

Companies in this quadrant have high traffic growth, but their total traffic is still relatively small compared to established players. Here we have *alhikmahakademi.com*, which shows a high increase in traffic growth, although it is currently still at a lower level in terms of total traffic. This suggests that this company may still be in its early stages of growth, but has great potential to expand in the future. Studies show that although the overall adoption of MOOCs in Indonesia is still low, there is a positive sentiment and growing awareness, especially among professionals in the IT and education fields, which shows that there is room for rapid growth among new players (Berliyanto & Santoso, 2018; Kurniasari et al., 2018).

4. Niche Players Quadrant

Companies in this quadrant have low total traffic and growth. Examples of companies here are *campusdigital.id*, arkademi.*com*, *diklat.online*, and *guruinovatif.id,* which show that they have

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a small user base and slower growth. These companies may focus on a more specific or niche market segment, and they have challenges scaling their operations.

In general, large platforms such as Duolingo and Universitas Terbuka continue to dominate in terms of user numbers, but new companies such as *alhikmahakademi.com are* emerging as promising competitors with high growth rates. Companies in the *Established Players* quadrant are likely to have reached a point of stability in terms of traffic, but may need to look for new strategies to increase their growth again. On the other hand, companies in *Niche Players* and *Game Changers* have the challenge of attracting more users to increase their visibility in this competitive market. The literature shows that the MOOC landscape in Indonesia is still in the development stage, with many platforms targeting specific segments or facing challenges in scalability due to a lack of awareness, infrastructure, and regulatory support. These niche players may struggle to grow, but can maintain relevance by focusing on niche content or underserved communities (Berliyanto & Santoso, 2018; Lubis et al., 2020).

Figure 3. Top Keywords

In August 2024 (see figure 3), keywords related to MOOC companies in Indonesia showed interesting trends in user searches. The most dominant keyword is "English," reflecting the high demand for courses in this language. In addition, the keyword "certificate" stands out, indicating the importance of formal recognition of the courses attended.

Some other keywords of interest include "data analysis bootcamp," "Excel pivot tables," and "data analysis techniques," indicating a growing interest in analytics skills and technical tools relevant to the job market, especially in the field of big data. Searches on "CV examples" and "HR" show a focus on career development and creating job application documents. Keywords such as "quality assurance" and "software engineering" reflect a strong interest in technology, especially in software development. These trends indicate an urgent need for language skills, formal certifications, and technical skills that are relevant in the world of work. Overall, MOOC users in Indonesia are focused on developing skills that can enhance their competitiveness in an increasingly competitive global job market.

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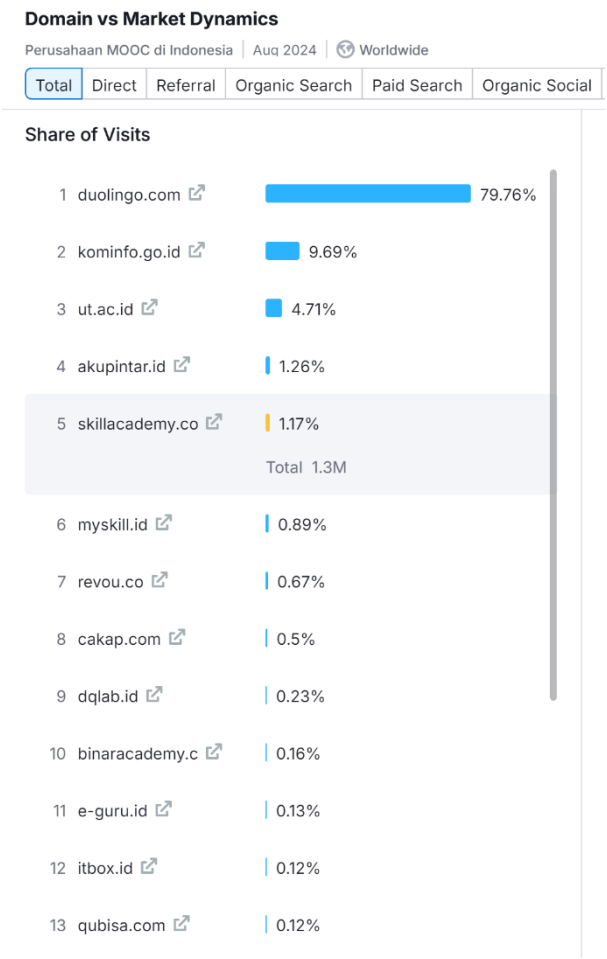

Figure 4. Domain vs Market Dynamics

As of August 2024, data shows 13 major domains dominating the MOOC (Massive Open Online Course) market in Indonesia with a total of 1.3 million visits. From this total, several important points can be drawn:

1. Duolingo.com dominated with a 79.76% share of visits, making it the largest player in the MOOC ecosystem in Indonesia. This reflects the popularity of language learning platforms among Indonesians.
2. Kominfo.go.id came in second with 9.69% of the total visits. This indicates the government's significant role in providing online learning content through programmes that focus on digitalisation and literacy.
3. Ut.ac.id (Universitas Terbuka) came in third with 4.71%, which shows that formal education institutions remain relevant in the online education market.
4. Akupintar.id and Skillacademy.co gained 1.26% and 1.17% of the visit share, respectively, indicating their important role, albeit relatively small compared to Duolingo.

Some other platforms, such as Myskill.id (0.89%), Revou.co (0.67%), and Cakap.com (0.5%), have smaller market shares but still contribute to providing online learning services in Indonesia.

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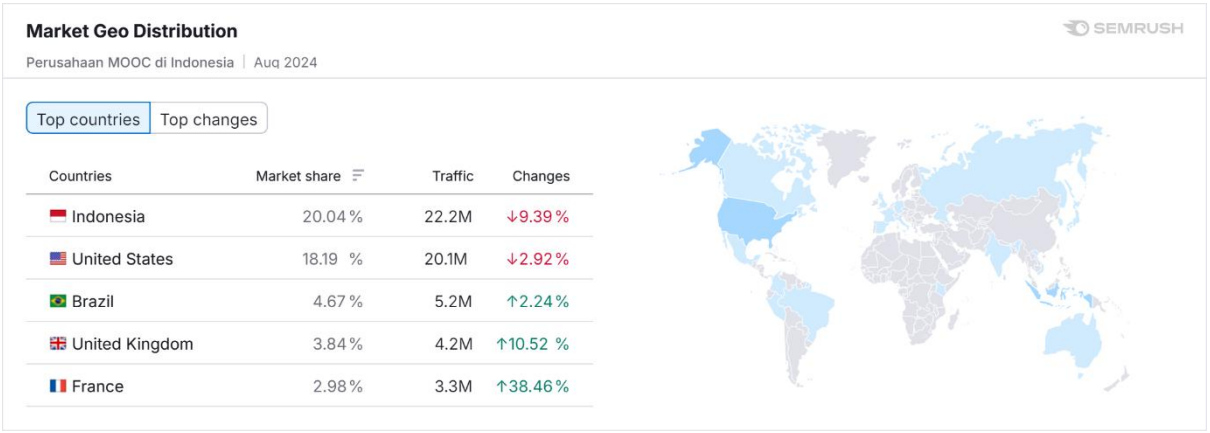

Figure 5. Market Geo Distribution

The 9.39% drop in traffic in the Indonesian local market indicates a decline in interest in MOOC platforms, which may be due to market saturation, switching to other platforms, or waning interest. Meanwhile, the second-placed United States also saw a 2.92% drop in traffic, signalling the challenge of retaining international users.

On the other hand, Brazil, the UK, and especially France showed a positive increase, with France experiencing a 38.46% increase in traffic, signalling great opportunities in the European market. Therefore, Indonesian MOOC companies are advised to focus more on this market. The growth in the UK, Brazil, and France also emphasises the importance of diversification through continuous innovation and customisation of content to suit local needs. Overall, despite the huge opportunities in the international market, new strategies are needed to maintain traction in the domestic market.

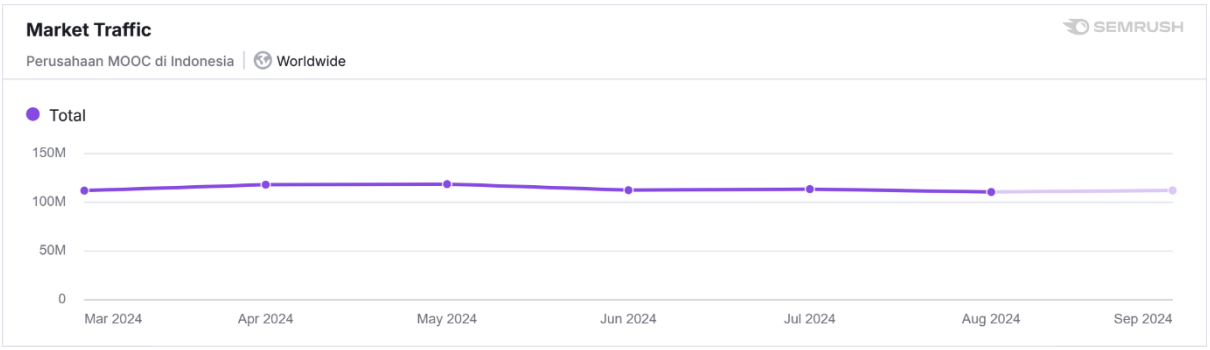

Figure 6. Market Traffic

The MOOC market traffic report in Indonesia for 2024 (see figure 6), from March to September, shows striking stability, with the number of users remaining around 100 million despite minor fluctuations, especially in July and August. The graph shows the purple line representing total traffic, signalling a balance in user growth during this period, despite a relatively minor dip in the middle of the year. The mild decline in July and August was likely due to seasonal factors, such as the holiday period. However, traffic stabilised again and even showed a slight increase towards the end of September. Although there was no drastic increase, the predictions for September show a small potential increase, which could be a sign of moderate growth. MOOC companies have the opportunity to expand their offerings by adding new programmes or venturing into new regions to increase the number of users. In the context of traffic stability, MOOC companies need to retain their existing user base as well as attract new users through courses relevant to current industry needs and the customization of content for various markets.

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DISCUSSION

From all the data we have presented, there are several interesting points, including first, Duolingo's dominance of almost 80% shows that this platform is very popular in Indonesia, especially in language learning. Duolingo attracts users with its interactive model and free access, which makes it a top choice for people who want to improve their language skills. Language skills are indeed one of the most in-demand in both the global and Indonesian markets. Some of the reasons users prefer the Duolingo application are the gamification feature, which is able to make users more enthusiastic and happy. Gamification in Duolingo is an effective strategy to make the process of learning a language more engaging, interactive, and motivating. Duolingo offers an interactive learning experience, where users can directly put the material they learn into practice. This is similar to the way the game actively engages players. Duolingo displays the user's learning progress in the form of graphs and statistics. This provides a real sense of accomplishment, similar to how players see their progress in the game. By integrating game elements such as challenges, rewards, competitions, and instant feedback, Duolingo manages to create a learning experience similar to playing a game. This not only increases user engagement but also helps them stay consistent in learning the language (Nasution et al., 2020; Syafrizal et al., 2022).

Duolingo has effectively incorporated gamification elements into its platform to foster intrinsic motivation among users. By employing features such as a points system, levels, rewards, and leaderboards, the platform transforms the traditionally passive process of learning a language into an interactive and dynamic experience. These gamified components provide users with a sense of achievement, which is crucial for maintaining motivation over time. The incorporation of these elements into the learning journey not only enhances engagement but also encourages users to form an emotional attachment to the brand, as they associate their progress and success with the app's features. This emotional connection becomes a critical driver of user retention, as individuals are more likely to return to the app and continue their learning experience when they feel both challenged and rewarded (Li, 2025).

In addition to the basic gamification features, Duolingo provides personalized learning experiences that cater to individual users' needs and preferences. This personalized approach is designed to meet users' psychological needs for competence, belonging, and autonomy, which are fundamental for long-term engagement and satisfaction. As users progress through various levels, they unlock special features and receive unique rewards, which further enhance their sense of competence and achievement. Moreover, Duolingo adapts its difficulty levels based on individual ability, ensuring that the learning process remains challenging yet achievable. This continuous feedback loop, combined with regular daily challenges, helps to sustain users' interest and creates a deeper sense of involvement with the platform. Personalized features, such as these, are instrumental in converting casual users into loyal, long-term learners (Shortt et al., 2023).

The engagement strategies employed by Duolingo align closely with Kotler's Customer Loyalty Ladder, which outlines the progression of customers from awareness to advocacy. Duolingo's gamification and personalized interactions accelerate this journey, driving users through the stages of trial and repeat usage, ultimately transforming them into advocates who recommend the app to others. As users engage more deeply with the platform, they not only improve their language skills but also enhance their emotional connection to the brand. The social components, such as discussion forums and community features, though still evolving, further strengthen this sense of community and encourage users to become brand advocates. By effectively utilizing these gamification strategies, Duolingo increases customer lifetime value and promotes sustainable growth through word-of-mouth and user advocacy (Deng et al., 2023).

Second, the importance of the government's role. Kominfo.go.id, with almost 10% share of visits, confirms that the government plays a crucial role in the development of online education, especially those related to digital literacy. The training programmes provided by Kominfo help

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improve the digital skills of the general public, thus creating a good collaboration between the public and private sectors in education. The government plays a crucial role in accelerating the adoption of digital technologies through Public-Private Partnerships (PPPs), which provide the necessary infrastructure and develop digital-based public services (Sidorenko & Khisamova, 2019). By integrating resources, expertise, and networks from both the public and private sectors, these collaborations drive digital transformation and expand service reach. Initiatives such as government digital platforms, electronic procurement systems, and online education programs exemplify how the government lowers entry barriers and enhances competition among existing players. These efforts not only make digital services more accessible but also create an environment conducive to innovation, inviting new entrants to participate and contribute to the digital economy.

From the perspective of Porter's Five Forces Framework, the government's role in facilitating PPPs has significant implications for market competition (Bak et al., 2025). The government's provision of digital infrastructure and data access reduces the threat of new entrants by lowering barriers to market entry, thereby encouraging innovation and participation. In terms of supplier and buyer bargaining power, these partnerships strengthen the government's negotiating position with technology providers, leading to improved service quality and accessibility (Yekimov et al., 2023). Moreover, government-driven digital initiatives mitigate the threat of substitute products by fostering competition and preventing monopolies, particularly by large technology companies. This ensures a dynamic and competitive market where innovation thrives, benefiting both consumers and service providers.

Third, Formal Education Institutions: The presence of the Universitas Terbuka (UT) in the third position shows that formal education institutions are able to adapt to online learning. With a share of 4.71%, UT is still the top choice for people seeking formal education online. The Universitas Terbuka is the pioneer of distance formal education in Indonesia. The demands of formal qualification competencies seem to provide an advantage to the MOOCs organized by the Universitas Terbuka. Until now, the majority of participants in this platform are satisfied with the flexibility of the platform, technological literacy, and meaningful learning. Universitas Terbuka, through its MOOCs, does not seem to need a special marketing strategy to get the attention of users. This is because the positioning of MOOCs from open universities is very strong as a pioneer of distance formal education (Ramdani et al., 2023).

Fourth, Emerging Local Platforms: Platforms such as Akupintar.id and Skillacademy.co, although with a share of visits still below 2%, remain important players in providing specific skills courses. The focus on technical skills, data analytics, and career development gives them a solid position in the MOOC ecosystem in Indonesia. This shows the need for platforms that focus more on practical and professional skills.

Fifth, Service Diversification: Platforms outside the top five, such as Revou.co, Cakap.com, and Binaracademy.co, have a relatively small share, but they target a more niche market. For example, training in technology or language development with certain specifications. Despite their small market share, they make an important contribution in providing more specialised education options that the big platforms may not offer.

Sixth, Blue Ocean Strategy on MOOC markets. The current MOOC (Massive Open Online Courses) market, marked by stability and minor fluctuations, indicates a phase of market saturation and increasing competition among existing platforms. This trend highlights the challenges new entrants face when trying to stand out in an overcrowded marketplace. To effectively navigate this competitive landscape, new players can look to trend marketing, which focuses on staying ahead

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of emerging market dynamics and consumer behaviors. By adopting the Blue Ocean Strategy, new MOOC platforms can avoid direct competition with dominant players, instead focusing on creating new, uncontested market space. This approach allows them to differentiate their offerings, tap into new demand, and carve out their niche by responding to evolving trends in education technology and learner preferences (Agnihotri, 2016).

The Blue Ocean Strategy for MOOCs aligns well with the principles of value innovation, which emphasizes creating innovative products or services that meet the evolving needs of the market. For instance, the integration of AI-driven personalized learning or the introduction of novel learning models taps into the growing demand for tailored educational experiences, reflecting a key trend in digital learning. Additionally, targeting underserved market segments and offering specialized courses can open up white space, a concept referring to unmet needs in the market. As part of a gradual approach known as Blue Ocean Droplets, new entrants can leverage trend marketing by introducing small, low-risk innovations that expand their market presence incrementally, building upon emerging trends while ensuring profitability and reducing direct competition. This strategic approach allows them to stay aligned with shifting market demands and secure a long-term competitive advantage (Christodoulou & Langley, 2020).

CONCLUSION

Overall, this data shows that the MOOC market in Indonesia and globally has entered a stable phase, with slight fluctuations that are not significant. This happens because MOOCs in Indonesia are dominated by several large courses, so that they have a massive impact, but the growth is slow. Although rapid growth may not happen in a short period of time, MOOC companies should continue to innovate and adjust to the changing needs of the market in order to maintain and increase their user base in the future. This is because MOOCs in Indonesia are dominated by a few large courses, giving the impression of being massive but slowing growth. The uniqueness of the MOOC market phenomenon in Indonesia is the existence of specific niches. In their development, MOOCs in Indonesia still greatly need infrastructure support and regulatory support that can regulate the sustainability of MOOCs in Indonesia. The suggestion for new entrants is that they should prepare strong characteristics and fit the needs of users. At least the target of 5% of SAM (540 million users) can be your target when you develop MOOCs and enter the MOOC market.

LIMITATION AND IMPLEMENTATIONS

This research uses machine learning found on a third-party platform, namely Semrush. The limitation of this study is that the data is presented based on the search time, which allows for different results if you search for data in the current period. However, this study seeks to provide an overview of the MOOC market data that is still not widely researched. You can use the results of this research to consider your market as a MOOC provider. Especially, there needs to be a special and specific niche for providers if they want to develop MOOCs in Indonesia.

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