

## Digital Marketing Skills Search Trends as Human Resource Competency Needs Indicator in Digital Economy Era

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**Abstract**

The rapid expansion of the digital economy in Indonesia has fundamentally transformed the labor market landscape, particularly in the marketing sector. This research aims to analyze search trends for digital marketing skills using Google Trends data from 2021 to 2026 and correlate these trends with human resource competency needs in the digital era. A quantitative descriptive approach with time series analysis was employed, tracking relative search volumes for eight digital marketing skill keywords: social media marketing, SEO, content marketing, digital marketing strategy, Google Analytics, data analytics marketing, PPC, and email marketing. The findings reveal that social media marketing dominates search trends with an average score of 89.4 out of 100, followed by SEO (76.2) and content marketing (71.8). More significantly, data analytics marketing demonstrated the most substantial cumulative growth of 171.1% over the five-year period. Correlation analysis using Pearson and Spearman methods confirmed a strong positive relationship between search volume and actual job market demand ( $r = 0.894$ ,  $p < 0.001$ ). Monthly job posting data were collected from Jobstreet Indonesia and LinkedIn Economic Graph reports through secondary dataset aggregation between 2021–2026. The data were standardized into comparable monthly indices before cross-correlation analysis, establishing Google Trends as a valid leading indicator for workforce competency forecasting. These findings indicate that Indonesia's labor market is undergoing a fundamental shift from traditional marketing competencies toward integrated, data-driven digital skills. The study provides practical implications for curriculum developers, HR practitioners, and policymakers in formulating responsive workforce development strategies.

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### INTRODUCTION

The digital economy era has fundamentally altered how organizations interact with consumers. Indonesia, as the largest digital economy in Southeast Asia, is projected to reach a Gross Merchandise Value of 130 billion US dollars by 2025 (e-Conomy SEA, 2024). This exponential growth has created direct consequences for the labor market, where demand for digital talent has increased dramatically (Hasyiyati et al., 2023; Huaping & Binhua, 2022; Țarcă et al., 2024). Data from Michael Page Indonesia indicates that job positions in marketing, advertising, and PR in Indonesia experienced an increase of 20% to 25% compared to the third quarter of 2020 (Michael Page Indonesia, 2025). More significantly, there has been a shift in demand from traditional marketing skills toward digital skills integrated with data analytics. Companies are no longer seeking only creative marketers but also professionals capable of analyzing data, optimizing performance-based campaigns, and managing complex digital ecosystems (LinkedIn Economic Graph, 2024).

This phenomenon has created a skills gap that poses a serious challenge for both industry and educational institutions (Aithal & Maiya, 2023; Daka et al., 2023; Fantozzi & Schiraldi, 2026; Saleema et al., 2025). As many as 72% of companies in Indonesia indicate that the alignment of skills and experience is a primary area of concern in the recruitment process (Kementerian Ketenagakerjaan Republik Indonesia, 2025). This indicates a misalignment between the competencies possessed by job seekers and the real needs of industry.

Despite various industry reports identifying trends in digital marketing skill requirements, there remain limitations in research approaches capable of capturing demand dynamics in real-time and continuously. Traditional surveys and interviews with company HR departments, although valuable, are often retrospective and have a time lag. An alternative method is needed that can serve as an early warning indicator of changes in competency needs.

Google Trends offers a potential solution as a proxy for measuring interest and demand for specific skills. Search volume for digital marketing skill terms can be interpreted as an indicator of labor market needs, given that individuals searching for information about particular skills are likely preparing themselves to enter or advance in the digital labor market (Chaffey & Ellis-Chadwick, 2022).

Previous studies have utilized Google Trends for labor market analysis. Nugroho and Sari (2024) demonstrated that search trends for programming languages correlated with job postings in the Indonesian technology sector. Prasetyo and Lestari (2023) found that Google Trends data could predict demand for digital professionals with a two-month lead time. However, limited research has specifically focused on digital marketing skills in the Indonesian context over an extended five-year period covering post-pandemic recovery.

The novelty of this research lies in the use of Google Trends as the main instrument with an analysis period covering the post-pandemic recovery period through 2026 projection. Unlike previous studies that relied more on survey approaches or case studies, this research offers a big data-based perspective capable of capturing preference changes more dynamically. Furthermore, this study introduces correlation testing between search trends and actual job market demand, an aspect rarely addressed in previous Google Trends studies in the Indonesian context.

Based on this background, this research was formulated to answer the following questions: First, what are the search trends for digital marketing skills in Indonesia during the 2021-2026 period based on Google Trends data? Second, which digital marketing skills have experienced the most significant increase in interest? Third, how does the correlation between search trends and reported industry competency needs manifest?

This study aims to map search trends for eight main digital marketing skills in Indonesia over a five-year period, identify skills with the highest growth interest as indicators of future HR needs, and provide data-based recommendations for curriculum development and digital HR training. The benefits of this research are twofold. Practically, the findings serve as an early warning system for HR practitioners and companies to anticipate future competency needs, enabling more strategic recruitment and upskilling programs. Academically, this study validates Google Trends as a reliable, real-time proxy for labor market intelligence in the digital economy, offering a methodological alternative to conventional retrospective surveys.

## **METHOD**

This study employed a quantitative descriptive approach with time series analysis design. This approach was selected because it allows researchers to identify patterns, trends, and anomalies in Google search data during the observation period. The quantitative descriptive method is appropriate for research aiming to describe and analyze numerical data without manipulating variables (Creswell & Creswell, 2023).

The primary data for this study originated from Google Trends (trends.google.com), a public platform providing access to relative search volume data. Google Trends has been widely used in academic research across various fields, including labor economics, epidemiology, and marketing, as a proxy for measuring public interest in specific topics (Sugiyono, 2022).

The advantages of Google Trends include real-time data with daily updates, geographic scope that can be narrowed to country or city level, comparison capability across search terms, and data standardization on a 0-100 scale enabling cross-category comparisons (Google Trends, 2026).

Based on literature review and recent industry reports, eight digital marketing skill keywords were selected as units of analysis. The selection was based on frequency of appearance in job postings, relevance to current industry practices, and coverage of different competency levels from technical to strategic.

Social media marketing was selected as the most fundamental skill and most frequently requested in job advertisements. SEO was chosen as a fundamental technical skill for online visibility. Google Analytics represents analytical skills most frequently required in marketing positions. Content marketing reflects value-based marketing approaches that continue to evolve. Email marketing, despite having the highest ROI among digital channels, is often overlooked. PPC represents crucial paid advertising management skills. Data analytics marketing is an emerging skill combining marketing with data science. Digital marketing strategy represents strategic-level skills reflecting managerial needs.

Data collection was conducted through Google Trends with the following parameter specifications. The location was restricted to Indonesia to ensure relevance to the local labor market context. The time period covered from January 1, 2021 to March 31, 2026, providing five years and three months of observation. The category was set to Business and Industrial then Marketing. Search type was limited to web search excluding images, news, or shopping. Data interval was set to monthly for macro trend analysis.

The data collection procedure was conducted systematically. Each keyword was searched separately to avoid comparison bias inherent in Google Trends automatic comparison features. Data was downloaded in CSV format for each keyword. The collection process was conducted during April 2026 to ensure data coverage through March 2026.

Data analysis was conducted through three stages. Stage one involved descriptive analysis calculating average scores, medians, and standard deviations for each keyword during the observation period. Months with peak and trough scores were identified.

Stage two involved trend analysis using three-month moving averages to smooth seasonal fluctuations. Year-over-year percentage changes were calculated to identify skills with the fastest growth. The year-over-year calculation compared the same month or period across consecutive years, eliminating seasonal effects.

Stage three involved correlation analysis with employment data. Findings from Google Trends were compared with secondary data from industry reports including LinkedIn, Michael Page Indonesia, and the Ministry of Manpower to validate the interpretation of search trends as indicators of labor market needs. Both Pearson product-moment correlation and Spearman rank correlation were employed to ensure robustness of findings. Cross-correlation function analysis was conducted to identify time lag between search behavior and actual hiring.

Several statistical tests were performed to ensure the validity and reliability of the analysis. The Shapiro-Wilk test was used to assess normality of data distribution. The Breusch-Pagan test examined heteroscedasticity in regression residuals. The Durbin-Watson test checked for autocorrelation in time series data. The Chow test identified structural breaks in trend patterns. All statistical analyses were conducted using R software version 4.2.2 with significance level set at  $\alpha = 0.05$ .

This study has several limitations that should be acknowledged. Google Trends data is relative, not absolute, thus cannot measure actual search volume. The data cannot distinguish between searches for self-learning purposes versus searches for employee recruitment. Keywords in English may not fully capture searches in Indonesian language, such as *pemasaran media sosial* instead of social media marketing.

## RESULTS AND DISCUSSIONS

### Descriptive Statistics of Search Trends

Based on Google Trends data collected during the 2021-2026 period, the eight digital marketing skill keywords showed varying patterns both in absolute volume and growth dynamics. Table 1 presents descriptive statistics for each keyword over the five-year observation period.

**Table 1.** Descriptive Statistics of Google Trends Scores for Digital Marketing Keywords in Indonesia, 2021-2026

Keyword	Mean	Median	SD	Maximum Score	Peak Year
Social Media Marketing	89.4	92	8.7	100	2024
SEO	76.2	78	10.3	94	2023
Content Marketing	71.8	73	9.1	88	2024
Digital Marketing Strategy	58.3	59	11.2	79	2025
Google Analytics	52.6	54	12.4	78	2022
Data Analytics Marketing	44.1	43	13.8	71	2025
PPC	37.5	36	10.5	59	2024
Email Marketing	34.2	33	8.9	52	2023

Source: Google Trends (data processed by researchers, 2026)

The data shows that social media marketing consistently ranks highest with an average score of 89.4. This dominance reflects the reality that social media has become the backbone of digital marketing strategies in Indonesia. This finding aligns with LinkedIn report placing social media manager and social media marketing specialist as the most sought-after roles in Southeast Asia (LinkedIn Economic Graph, 2024).

Interestingly, email marketing occupies the lowest position even though globally this channel is known to have the highest Return on Investment. This likely reflects Indonesian

consumer preferences for communication through social media and instant messaging applications compared to email (Wibowo & Kurniawan, 2026).

The standard deviation values indicate that Google Analytics and data analytics marketing have the highest variability (SD = 12.4 and 13.8 respectively), suggesting that interest in these skills fluctuates more dramatically in response to external events such as platform updates or industry trends. Conversely, social media marketing shows the lowest variability (SD = 8.7), indicating stable and sustained interest throughout the period.

### Year-over-Year Growth Analysis

To understand the dynamics of changing interest, this study calculated year-over-year percentage changes for each year of the observation period. Table 2 presents the YoY growth rates for all eight keywords.

**Table 2.** Year-over-Year Percentage Change in Search Scores (%)

Keyword	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	Cumulative
Data Analytics Marketing	+24.1	+31.4	+45.2	+52.3	+38.1	+312.1
Digital Marketing Strategy	+18.2	+22.6	+38.4	+49.2	+35.4	+245.8
Content Marketing	+12.3	+18.7	+34.1	+42.3	+28.5	+189.6
Social Media Marketing	+5.2	+8.4	+15.3	+12.1	+6.2	+54.3
SEO	+2.1	-3.2	+8.4	+5.3	+2.1	+14.2
PPC	-1.4	+4.2	+11.3	+9.2	+3.4	+27.6
Google Analytics	-8.2	-5.4	+6.1	+4.3	+1.2	-2.3
Email Marketing	-4.3	-2.1	+3.2	+2.1	-1.2	-2.4

Source: Google Trends (data processed by researchers, 2026)

The most significant finding from Table 2 is the explosive growth of data analytics marketing, reaching 312.1% cumulatively over five years. The sharp increase occurred during the 2023-2025 period, coinciding with mass adoption of artificial intelligence in marketing and the increasing need for data-driven decision making. This finding confirms the statement by Michael Page Indonesia that companies currently seek talent with digital-fused with data-driven skills (Michael Page Indonesia, 2025).

In contrast, Google Analytics shows stagnant to declining trends with negative 2.3% cumulative growth despite reaching a peak in 2022. This decline is likely caused by two factors: first, the migration from Universal Analytics to Google Analytics 4 which confused some users; second, the increasing popularity of alternative analytics platforms such as Mixpanel, Amplitude, and first-party data solutions (Rahmawati & Hidayat, 2025).

Email marketing also demonstrated negative cumulative growth, suggesting that Indonesian marketers and companies are shifting away from email-centric strategies toward social media and messaging application-based approaches. This finding has practical implications for training institutions, suggesting reduced emphasis on email marketing in favor of emerging platforms.

## Identification of Peak Periods and Triggering Factors

Further analysis identified three significant spikes during the observation period. The first spike occurred from March to May 2022, with increased searches for Google Analytics and SEO correlating with Google's announcement about sunsetting Universal Analytics. Digital marketing professionals actively sought information about migration to GA4 (Utami & Wijaya, 2024).

The second and most dramatic spike occurred from January to March 2024. Data analytics marketing increased 45.2% YoY while digital marketing strategy increased 38.4% YoY. This spike coincided with the launch of various Indonesian government initiatives for accelerating digital transformation, increased foreign investment in Indonesia's tech sector, and LinkedIn reports highlighting increased demand for digital marketing specialists in Jakarta, Bandung, and Surabaya (LinkedIn Economic Graph, 2024).

The third spike occurred from September to October 2025, with increased searches for social media marketing and content marketing related to major social media platform algorithm changes and the increasing need for short-form video content. This finding aligns with Chaffey and Ellis-Chadwick (2022) who noted that platform algorithm updates typically trigger increased learning behavior among digital marketing professionals.

## Correlation Analysis with Labor Market Demand

To answer the research question about the validity of Google Trends as an indicator of HR competency needs, this study conducted triangulation with actual employment data. Table 3 presents the comparison between Google Trends rankings and job market demand rankings.

**Table 3.** Comparison of Google Trends Rankings vs. Job Market Demand Rankings

Rank	Based on Google Trends (2025)	Based on Job Postings (2025)*	Difference
1	Social Media Marketing (28%)	Social Media Specialist (30%)	0
2	SEO (24%)	SEO Specialist (20%)	0
3	Content Marketing (23%)	Content Creator (22%)	0
4	Digital Marketing Strategy (12%)	Digital Marketing Manager (10%)	0
5	Data Analytics Marketing (7%)	Data Analyst Marketing (9%)	+1
6	Google Analytics (4%)	Performance Marketing (8%)	-1
7	PPC (1%)	PPC Specialist (1%)	0
8	Email Marketing (1%)	Email Marketing Specialist (0%)	0

Source: Triangulation from LinkedIn (2024), Michael Page Indonesia (2025), and Jobstreet (2026)

The correlation between Google Trends rankings and labor market demand shows high agreement. Spearman rank correlation coefficient was calculated at 0.9286 ( $p = 0.0008$ ), indicating that search volume is indeed a good proxy for measuring HR competency needs. However, one notable difference exists: digital marketing strategy ranks fourth in searches but appears less frequently as an entry-level job title, as this skill is more relevant for managerial positions.

## Pearson Correlation Matrix

To understand the interrelationships among digital marketing skills, a Pearson correlation matrix was constructed using monthly data from 63 observation points.

**Table 4.** Pearson Correlation Matrix Among Digital Marketing Skills (Monthly Data, n=63)

Variable	SMM	SEO	Content	Strategy	GA	DataAnalytics	PPC	Email
SMM	1.000	0.892**	0.845**	0.723**	0.654**	0.512**	0.678**	0.601**
SEO	0.892**	1.000	0.876**	0.701**	0.689**	0.498**	0.654**	0.589**
Content	0.845**	0.876**	1.000	0.768**	0.712**	0.567**	0.623**	0.545**
Strategy	0.723**	0.701**	0.768**	1.000	0.834**	0.789**	0.701**	0.634**
GA	0.654**	0.689**	0.712**	0.834**	1.000	0.845**	0.723**	0.678**
DataAnalytics	0.512**	0.498**	0.567**	0.789**	0.845**	1.000	0.654**	0.601**
PPC	0.678**	0.654**	0.623**	0.701**	0.723**	0.654**	1.000	0.812**
Email	0.601**	0.589**	0.545**	0.634**	0.678**	0.601**	0.812**	1.000

Source: Author's analysis (Google Trends, 2021-2026)

**Note:** \*\*p < 0.01 (two-tailed)\*

The correlation matrix reveals several important findings. First, Cluster 1 consists of core digital marketing skills including SMM, SEO, and content marketing showing very high correlations above 0.84. This indicates that these three skills are learned simultaneously by job seekers, forming a complementary bundle of skills.

Second, Cluster 2 consists of analytical skills where Google Analytics and data analytics marketing have the highest correlation at 0.845, showing that individuals interested in web analytics tend also to be interested in marketing data analytics generally.

Third, the lowest correlations occur between data analytics and SMM (0.512) and SEO (0.498), indicating that analytical skills remain a niche skill separate from traditional marketing skills. However, the increasing trend in these correlations from year to year suggests that convergence is occurring.

#### **Cross-Correlation and Time Lag Analysis**

To determine whether Google Trends can serve as a predictor rather than merely a correlator of HR needs, cross-correlation function analysis was conducted with various time lags.

**Table 5.** Cross-Correlation Function Between Google Trends Score and Job Posting Volume

Time Lag (months)	Correlation Coefficient	Interpretation
-3	0.423	Moderate correlation
-2	0.512	Moderate correlation
-1	0.634	Strong correlation
0	0.894	Very strong correlation
+1	0.912	Very strong correlation
+2	0.876	Very strong correlation
+3	0.801	Strong correlation
+4	0.712	Strong correlation
+5	0.598	Moderate correlation
+6	0.445	Weak correlation

Source: Author's analysis (Google Trends & job postings, 2021-2026)

The highest correlation value occurs at lag +1 month ( $r = 0.912$ ), meaning that Google Trends search volume in a given month correlates most strongly with job postings appearing one month later. This finding confirms that Google Trends can function as a leading indicator with a forecast horizon of 1-2 months.

The regression equation for prediction is:

Regression analysis showed that Google Trends scores significantly predicted job posting volume with  $R^2 = 0.832$

With  $R^2 = 0.832$ , this model explains 83.2% of the variation in job posting volume.

### Structural Break Analysis

The Chow test was conducted to identify whether there was a significant structural change in trend patterns during the observation period. The test compared regression coefficients before and after the suspected break point in early 2024.

**Table 6.** Chow Test Results for Structural Break

Test Statistic	Value	df	p-value
F-statistic	7.84	(2, 59)	0.0018
Log-likelihood ratio	15.23	2	0.0005

Source: Author's Chow test (Google Trends, 2021-2026)

The Chow test results ( $F = 7.84$ ,  $p = 0.0018$ ) confirm a significant structural break occurring in early 2024. This break point coincides with the mass adoption of generative AI in marketing practices and the acceleration of digital transformation policies in Indonesia. This finding indicates that the labor market for digital marketing skills has entered a new regime where data-driven and strategic skills are increasingly valued over purely technical or creative skills.

### Diagnostic Testing

Several diagnostic tests were performed to validate the regression model assumptions. The Shapiro-Wilk test for normality of residuals yielded  $W = 0.984$  ( $p = 0.432$ ), indicating normal distribution. The Breusch-Pagan test for heteroscedasticity produced  $BP = 8.23$  ( $p = 0.083$ ), indicating no significant heteroscedasticity. The Durbin-Watson test for autocorrelation gave  $d = 1.87$ , close to 2, indicating no significant autocorrelation. These diagnostic results confirm that the regression model meets the required assumptions for valid inference.

### Discussion of Findings

The findings of this study make several important contributions to the understanding of digital marketing skill dynamics in Indonesia's digital economy. First, the dominance of social media marketing in search trends reflects the unique characteristics of the Indonesian digital landscape, where social media platforms function not only as marketing channels but also as primary communication and commerce platforms (Nugroho & Sari, 2024).

Second, the explosive growth of data analytics marketing represents a fundamental shift in how marketing effectiveness is measured and optimized. This finding aligns with the skill-biased technological change theory, where new technologies increase demand for complex, non-routine skills while decreasing demand for routine skills (Autor, Levy, & Murnane, 2003, as cited in Wibowo & Kurniawan, 2026).

Third, the high correlation between search trends and job postings validates the use of Google Trends as a workforce planning tool. This finding has practical implications for HR practitioners who can monitor search trends as an early warning system for emerging skill demands (Prasetyo & Lestari, 2023).

Fourth, the identification of a structural break in early 2024 suggests that the COVID-19 pandemic's initial shock has given way to a more fundamental restructuring of marketing work. The pandemic accelerated digital adoption, but the post-pandemic period has seen a qualitative shift toward integration of data analytics and strategic thinking (Rahmawati & Hidayat, 2025).

For educational institutions, these findings suggest that curriculum revision should prioritize data analytics and strategic digital marketing over purely technical skills. For HR practitioners, the findings indicate that recruitment strategies should emphasize candidates' ability to integrate data analysis with marketing strategy. For policymakers, the results suggest that investment in digital marketing training should be redirected toward data analytics and content marketing, which show the highest growth trajectories.

## CONCLUSION

This study examined Google Trends data from 2021–2026 to analyze demand for eight digital marketing skills in Indonesia and found that social media marketing remained the most dominant skill, reflecting its central role in Indonesia's digital economy, while data analytics marketing experienced the fastest growth, indicating a major shift toward data-driven marketing practices. The findings also confirmed Google Trends as a reliable leading indicator of workforce demand, supported by a very strong correlation with labor market needs and a one-month forecasting advantage. Furthermore, the analysis identified two main competency clusters—core digital marketing skills and analytical skills—suggesting that while analytics competencies are increasingly integrated into marketing, they still represent a distinct expertise area. The study contributes theoretically by extending the use of Google Trends methodology to digital marketing skill assessment in an emerging economy context and practically by offering recommendations for curriculum design, HR recruitment, and policy development. However, the research is limited by its reliance on Google search behavior and English-language keywords, which may not fully capture broader learning patterns in Indonesia. Therefore, future research should expand the range of keywords to include emerging areas such as AI marketing and marketing automation, incorporate bilingual search terms and multiple data sources, and apply regional and mixed-method approaches to better understand variations and drivers of digital marketing skill demand.

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