

Assessment Methodology for Digital Presence of E-Commerce and Retail Enterprises: Conceptual Foundations and Performance Indicator System

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Abstract. Digital presence has become a critical determinant of enterprise competitiveness in the e-commerce and retail sectors; however, the concept lacks a universally accepted definition and a unified measurement framework in the academic literature. Existing approaches (technological, marketing-oriented, index-based, and strategic) capture only partial aspects of digital presence and do not integrate technical, search, behavioural, and social dimensions into a single assessment system. This study aims to develop a comprehensive methodology for assessing the digital presence of e-commerce and retail enterprises based on open analytical data. This research employs a critical synthesis of four conceptual approaches, structural decomposition to substantiate a four-dimensional framework, and a comparative ranking method to construct an integrated Digital Presence Index (DPI). Drawing on this synthesis, an original definition is proposed: enterprise digital presence is an integral, dynamic characteristic of a brand's visibility, discoverability, and engagement in the digital environment that is measurable and suitable for comparative competitive positioning. The proposed methodology comprises three sequential blocks: (1) a digital presence audit across four dimensions, namely technical (Core Web Vitals: LCP, INP, TTFB, CLS), search (organic and paid traffic share, Authority Score), behavioural (Bounce Rate, Pages per Visit, Visit Duration), and social (Engagement Rate, Sentiment Score), using Google PageSpeed Insights, SimilarWeb, and Semrush; (2) two-level benchmarking against e-commerce market leaders and specialised segment competitors; and (3) an integrated Scorecard based on the 5-3-1 ranking principle. Unlike existing approaches, the proposed methodology integrates all four dimensions into a unified two-level benchmarking system for e-commerce and retail companies. Further research should address empirical validation, the development of industry-specific KPI weighting coefficients, and extension to mobile applications and omnichannel integration metrics.

Keywords: digital presence, digital presence assessment, e-commerce, retail, benchmarking, digital marketing.

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Методика оцінювання цифрової присутності підприємств електронної комерції та ритейлу:
концептуальні засади та система показників

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Анотація. Цифрова присутність підприємства є визначальним чинником конкурентоспроможності в умовах зростання частки e-commerce та ритейлу, проте у науковій літературі відсутнє єдине визначення цього поняття та уніфікована методологія його вимірювання. Наявні підходи (технологічний, маркетинговий, індексний та стратегічний) охоплюють лише окремі аспекти цифрової присутності та не інтегрують технічний, пошуковий, поведінковий і соціальний виміри в єдину систему оцінювання. Метою статті є розробка комплексної методики оцінювання цифрової присутності підприємств електронної комерції та ритейлу на основі відкритих аналітичних даних. Дослідження ґрунтується на критичному синтезі чотирьох концептуальних підходів, структурній декомпозиції чотиривимірної моделі та порівняльному ранжуванні для побудови інтегрального індексу цифрової присутності (ІІЦП). На основі синтезу підходів запропоновано авторське визначення цифрової присутності підприємства як інтегральна динамічна характеристика видимості, знайденості та залученості бренду в цифровому середовищі, що є вимірюваною і придатною для порівняльної оцінки конкурентних позицій. Розроблено трьоблокову методику: (1) аудит за чотирма вимірами, а саме технічним (Core Web Vitals: LCP, INP, TTFB, CLS), пошуковим (частка органічного та платного трафіку, Authority Score), поведінковим (Bounce Rate, Pages per Visit, Visit Duration) і соціальним (Engagement Rate, Sentiment Score), з використанням Google PageSpeed Insights, SimilarWeb та Semrush; (2) дворівневий бенчмаркінг відносно лідерів e-commerce та профільних конкурентів сегмента; (3) інтегральна бальна оцінка за принципом ранжування 5-3-1. На відміну від наявних підходів, запропонована методика вперше поєднує всі чотири виміри в єдину систему дворівневого бенчмаркінгу для підприємств електронної комерції та ритейлу. Перспективами подальших досліджень є емпірична валідація на репрезентативній вибірці підприємств, розробка галузевих вагових коефіцієнтів для KPI та розширення методики на показники мобільного застосунку й омніканальної інтеграції.

Ключові слова: цифрова присутність, оцінювання цифрової присутності, електронна комерція, ритейл, бенчмаркінг, цифровий маркетинг.

Problem Statement. The digital transformation of the economy has fundamentally altered the conditions of competition, as the ability of an enterprise to operate effectively in the digital environment has evolved from an optional advantage to a necessary prerequisite for market success. This challenge is particularly acute for retail and e-commerce enterprises, which are required to simultaneously maintain offline networks while expanding their digital channels under conditions of continuous annual growth in online trade.

Despite the increasing research attention devoted to the digital aspects of enterprise activity, the concept of digital presence lacks a single, universally accepted definition in academic literature. Existing approaches differ substantially, ranging from narrow technological perspectives, such as website quality and SEO optimisation, to broader strategic interpretations related to the digital transformation of business models. Simultaneously, none of the existing approaches propose a methodology that systematically integrates the technical, search, behavioural, and social dimensions of digital presence into a unified assessment framework and enables a substantiated two-level benchmarking based on open data.

This limitation complicates the formulation of well-grounded strategic decisions regarding the allocation of investments in digital development and hinders systematic comparisons of competitive positions within the digital environment.

Analysis of Recent Research and Publications. An analysis of the academic literature reveals several research streams directly related to the assessment of an enterprise's digital presence.

The first stream, which is the most methodologically proximate to the focus of this article, comprises studies that measure digital presence through traffic and search metrics. Ponzoa, Gómez and Mas [1] proposed the Institutions Digital Development Index (IDDI), representing one of the earliest

quantitative models for assessing the digital presence of 194 public and private organisations across the EU and the United States based on Semrush data. Erdmann and Ponzoa [2] operationalised digital presence in e-commerce through SEO and SEM indicators, applying an analytical model grounded in optimal advertising budget theory to a sample of 29 companies across six countries. Collectively, these studies establish a methodological foundation for the quantitative measurement of digital presence using open analytical data.

The second stream consists of systematic reviews of digital marketing metrics and key performance indicators (KPIs). Saura, Palos-Sánchez, and Cerdá Suárez [3] conducted a systematic review of 378 studies, identifying core web analytics and digital marketing KPIs relevant to digital presence measurement. Saura [4] further synthesised frameworks, methods, and performance metrics within the domain of data-driven digital marketing.

The third stream encompasses research linking digital presence to enterprise competitiveness. Szucs [5] developed a quantitative model based on a multi-step algorithm applied to approximately 800 firms, demonstrating that the quality of online presence has a positive effect on competitiveness and serves as an early warning signal for financial performance deterioration. Extending this line of enquiry to small and medium-sized enterprises, Lányi et al. [6] conceptualised digital activity at the strategic level. Their findings indicate that continuous monitoring of competitors' website maturity provides valuable benchmarking insights, while the dynamics of changes in digital presence -both firm-specific and market-wide - may function as leading indicators of future shifts in overall competitiveness.

The fourth stream focuses on developing tools for evaluating website quality. Suryani et al. [7] developed and validated the SMEs-WebQ scale, comprising 15 items across three dimensions (system quality, information quality, and service readiness), which serves as a standardised instrument for assessing the technical component of digital presence. Halkiopoulos and Papadopoulos [8] examined the relationship between web technology quality and digital competitiveness in the hospitality industry.

Strategic and marketing aspects of digital presence have been explored by Manjunath, Padigar and Pedada [9], Mazzucchelli et al. [10], and Silva, Silva and Dias [11]. Issues related to digital user experience were addressed by Radoš and Babić [12], while Schallmo, Williams, and Boardman [13] and Westerman, Bonnet, and McAfee [14] developed digital maturity models.

Despite the substantial body of research, no methodology comprehensively integrates the technical (Core Web Vitals), search (SEO/PPC), behavioural, and social dimensions of digital presence into a unified analytical system suitable for two-level benchmarking of e-commerce and retail enterprises based on publicly available platforms.

The analysis of the existing literature makes it possible to identify three key scientific and methodological gaps.

First, the current methodologies for measuring digital presence are inherently one-dimensional in structure. The IDDI [1] primarily captures traffic and search-related indicators; SMEs-WebQ [7] focuses exclusively on the technical quality of websites; and [3, 4] systematise marketing KPIs without integrating them with technical performance metrics. None of these approaches incorporate Core Web Vitals, which have constituted an official Google ranking signal since 2021 and were updated in March 2024 with the replacement of FID by INP [15].

Second, none of the identified methodologies incorporates a two-level benchmarking framework that would allow the simultaneous evaluation of an enterprise relative to e-commerce market leaders (reflecting overall digital strength) and direct competitors within a specialised segment (reflecting industry-specific competitive position). Single-level benchmarking may lead to distorted conclusions, as an enterprise that lags behind large aggregator platforms in terms of traffic may nevertheless dominate its niche in terms of engagement.

Third, existing methodologies are predominantly designed for academic applications and typically require proprietary corporate data or primary data collection. In contrast, contemporary open analytical platforms, such as SimilarWeb, Google PageSpeed Insights, and Semrush, provide a sufficient database for reproducible quantitative assessments. However, their potential has not yet been realised through a systematic methodology tailored to e-commerce.

Purpose of the Article. This study aims to develop a comprehensive methodology for assessing the digital presence of e-commerce and retail enterprises based on open analytical data. To achieve this aim, the following objectives were defined: (1) to conduct a critical analysis and synthesis of existing approaches to defining the concept; (2) to substantiate a four-dimensional framework with corresponding KPI systems; and (3) to design a three-block methodology encompassing a digital presence audit, two-level benchmarking, and integrated assessment.

Conceptualisation of Digital Presence: A Critical Review of Existing Approaches. A review of the academic literature makes it possible to distinguish four principal approaches to defining and operationalising the concept of enterprise digital presence: technological, marketing, index-based, and strategic (Table 1).

Table 1

Approaches to defining the concept of «enterprise digital presence» in the scientific literature

Approach	Essence of the definition	Limitations	Key authors
Technological	A combination of digital tools and platforms (website, social media, search engines)	Fails to consider the quality of engagement with the audience	Suryani et al. (2024); Halkiopoulos & Papadopoulos (2022)
Marketing	The ability to attract and retain the target audience through digital channels; measured via SEO/SEM metrics	Focus is predominantly on traffic and search channels	Erdmann & Ponzoa (2021); Mazzucchelli et al. (2021); Saura et al. (2017)
Index-based / Measurement	Digital presence as an integral index calculated based on traffic variables, enabling inter-organisational comparison (IDDI)	Developed specifically for institutions; not adapted for e-commerce/retail	Ponzoa, Gómez & Mas (2023); Lányi et al. (2021)
Strategic	A competitive advantage shaped as a result of the digital transformation of the business model	Conceptual rather than operationalised level	Westerman et al. (2014); Schallmo et al. (2017); Manjunath et al. (2024); Silva et al. (2024)

Source: systematised by the author based on [1-13]

The technological approach conceptualises digital presence as a set of digital platforms and tools, including websites, social media, and search engines. Its primary strength lies in its high level of operationalisation, as website quality, SEO parameters and technical performance can be readily measured. However, it does not adequately capture the quality of audience interaction or the strategic dimensions of digital activity.

The marketing approach focuses on an enterprise's ability to attract and retain a target audience through digital channels [2]. This capability is typically operationalised through SEO and SEM metrics. In particular, the balance between organic and paid traffic serves as an indicator of strategic orientation: a higher share of organic traffic reflects a sustainable long-term presence, whereas a higher share of paid traffic indicates a short-term, acquisition-driven strategy. The limitation of this approach lies in its focus on traffic indicators without accounting for technical performance or social media engagement.

The index-based approach is methodologically closest to the framework proposed in this paper. It conceptualises digital presence as an integral index derived from traffic variables, enabling a

comparative analysis across organisations. Prior studies [1, 6] have demonstrated that such indices can reveal relationships between digital development and organisational competitiveness and provide valuable benchmarking insights through competitor monitoring. However, these approaches are constrained by the absence of technical performance metrics, particularly Core Web Vitals, and the omission of the social dimension. Additionally, they are not fully adapted to the specific characteristics of the e-commerce and retail sectors.

The strategic approach interprets digital presence as both a result and driver of digital transformation in business models [13; 14]. Although this approach offers substantial theoretical value, it remains largely conceptual and does not provide an operational measurement system.

Based on the synthesis of these approaches, digital presence is defined in this study as an integral and dynamic characteristic of a brand's visibility, discoverability, and engagement in the digital environment. It is formed through the interaction of technical infrastructure, search visibility, audience behavioural patterns, and social media activity, and can be measured using a system of quantitative indicators that enable a comparative assessment of competitive positions.

The proposed definition differs from existing interpretations in three key ways. First, it emphasises the dynamic nature of digital presence, which evolves as a result of both firm-level actions and algorithmic changes on digital platforms. Second, it treats measurability as a constitutive feature of the concept, rather than merely a methodological attribute. Third, it explicitly incorporates technical performance as an equal dimension to marketing and behavioural components.

Four-Dimensional Structure of Digital Presence. Structurally, digital presence comprises four interrelated dimensions (Figure 1). Only their combined consideration provides a comprehensive representation of an enterprise's competitive position in the digital environment.

The technical dimension is determined by the quality and performance of digital infrastructure. The central evaluation standard is the Core Web Vitals, a set of metrics reflecting real user experience and functioning as an official Google ranking signal since June 2021 [15]. In March 2024, Google replaced the First Input Delay (FID) with Interaction to Next Paint (INP), which provides a more comprehensive measure of interactivity by capturing browser responsiveness across all user interactions within a session rather than only the first. Importantly, Core Web Vitals are considered a ranking signal rather than a dominant factor: poor values negatively affect visibility, whereas good values remove constraints but do not independently guarantee higher rankings [15].

The search dimension reflects an enterprise's visibility in both organic and paid searches. The balance between SEO and PPC serves as a strategic indicator of customer acquisition. Empirical evidence [2] suggests that digitally native firms demonstrate higher efficiency in inbound digital marketing than click-and-mortar enterprises, while organic traffic represents a more stable and less volatile channel. Domain authority (Authority Score) serves as an aggregated indicator of search engine trust.

The behavioural dimension captures the quality of user interaction with digital assets. The bounce rate in e-commerce typically falls within an optimal range of 25-40 % [3] and serves as an indicator of content relevance and user experience quality. Simultaneously, the conversion rate represents the most critical behavioural metric; however, within the context of external auditing, it is generally unavailable because of its commercial sensitivity.

The social dimension characterises activity on social media and the quality of audience engagement. Social media analytics is a strategic resource for digital marketing, providing real-time feedback and enabling data-driven strategy adjustments [4]. The engagement rate is a more informative indicator than the absolute number of followers, as it reflects the actual interaction between the audience and brand content [10].



Fig. 1. Four-dimensional structure of digital presence of e-commerce and retail enterprises.
Source: Developed by the author based on [1-8; 12; 15]; visualisation created using generative AI tools (ChatGPT, OpenAI) without automated generation of research content.

Three-Block Methodology for Assessing Digital Presence. The proposed methodology was structured into three sequential analytical blocks (Table 2). Its underlying principle is a progression

from primary data collection to the formulation of strategic recommendations, ensuring logical consistency and practical applicability of the results.

Table 2

Three-block methodology for assessing digital presence of e-commerce and retail enterprises

Block	Content	Methods and tools	Result
Block 1. Digital presence audit	Collection and systematisation of metrics across four dimensions: technical, search, behavioural, and social	Google PageSpeed Insights; SimilarWeb; Semrush; native analytics of social platforms	Digital profile of the enterprise with quantitative values for each dimension
Block 2. Multi-level benchmarking	Two-level comparison: (1) with e-commerce market leaders; (2) with profile competitors within a specialised segment	Comparative analysis of open data; selection of relevant competitors	A map of competitive gaps for each dimension and level of comparison
Block 3. Integral scoring (Scorecard)	Conversion of diverse indicators into a single 5-point scale (5-3-1 principle). Differentiation between positive and negative metrics	Ranking and normalisation methods	Integral Index of Digital Presence (IIDP); strategic investment priorities

Source: developed by the author.

Block 1. Digital Presence Audit. The first block involves the collection and systematisation of metrics across the four dimensions using open analytical platforms. A key advantage of this approach is its full reproducibility: all selected tools are publicly accessible, which eliminates dependence on proprietary corporate data and enables independent, external auditing.

The KPI system for each dimension, including the benchmark values and data sources, is presented in Table 3.

Table 3

KPI system for assessing digital presence of e-commerce and retail enterprises

Indicator (KPI)	Benchmark / Target	Data source
Technical		
Largest Contentful Paint (LCP)	< 2.5 s	Google PageSpeed Insights (CrUX)
Interaction to Next Paint (INP)	< 200 ms	Google PageSpeed Insights (CrUX)
Time to First Byte (TTFB)	< 0.8 s	Google PageSpeed Insights (CrUX)
Cumulative Layout Shift (CLS)	< 0.1	Google PageSpeed Insights (CrUX)
Search		
Share of organic traffic (SEO)	> 40% (e-commerce)	SimilarWeb
Domain Authority Score	> 60: good; > 75: excellent	Semrush / Ahrefs
Share of paid traffic (PPC)	Strategy-dependent	SimilarWeb
Behavioural		
Bounce Rate	25–40% (e-commerce)	SimilarWeb / Google Analytics
Pages per Visit	> 3.5	SimilarWeb / Google Analytics
Avg. Visit Duration	> 2:00 min	SimilarWeb / Google Analytics
Social		
Engagement Rate (ER)	1–5% (platform-dependent)	Native analytics / Fanpage Karma
Share of social traffic	Industry average	SimilarWeb Social
Sentiment Score	> 60% positive	Brand24 / AI tools

Source: developed by the author based on [1-8; 15].

A methodological note regarding Google PageSpeed Insights is that the tool provides two types of data: laboratory data, which are simulated and used for rapid testing, and field data derived from the Chrome User Experience Report (CrUX), which reflects the real experiences of millions of users over a 28-day period. For the purpose of digital presence assessment, priority should be given to CrUX field data, as they capture the actual user experience rather than modelled test conditions.

Block 2. Multi-Level Benchmarking. The second block involves a comparative analysis at two levels, each providing qualitatively distinct strategic insights and being mutually complementary.

Level 1: Benchmarking against e-commerce market leaders assesses the overall digital strength of an enterprise relative to the largest online players, irrespective of their product specialisation. It addresses the question: "How developed is our digital presence at the market level?"

Level 2: Benchmarking against direct competitors within a specialised segment provides a more contextually relevant assessment of competitive positioning among firms with similar product offerings and customer interaction models. It addresses the question: "What is our position among direct competitors?"

This two-level structure is essential because single-level benchmarking may lead to distorted conclusions. Continuous monitoring of competitors' digital presence generates valuable benchmarking insights and may serve as a leading indicator of changes in competitiveness [6]. The criteria for competitor selection include the similarity of business models (for Level 2), availability of open analytical data, and representativeness within the relevant competitive context.

Block 3. Integrated Scorecard Assessment. The third block transforms heterogeneous absolute indicators into a unified comparative scale, the Integrated Digital Presence Index (DPI). This is achieved through the application of the 5-3-1 ranking principle (Table 4), which enables the aggregation of multidimensional metrics into a single integral score suitable for comparative evaluation and strategic interpretation.

Table 4

The 5-3-1 ranking principle for the integral scoring of digital presence of e-commerce and retail enterprises

Metric category	5 points (Leader)	3 points (Average)	1 point (Outsider)
Stimulant / Positive metrics (higher values are better)	Highest value among the compared enterprises	Intermediate value	Lowest value
De-stimulant / Negative metrics (lower values are better)	Lowest value (best result)	Intermediate value	Highest value (worst result)
Examples of positive metrics	Traffic volume; SEO share; pages per visit; visit duration; number of followers; Authority Score		
Examples of negative metrics	Bounce Rate; INP; TTFB; liability level; Country Rank (lower numerical value = better position)		

Source: developed by the author.

The 5-3-1 ranking principle is selected over alternative approaches (such as z-score normalisation or a 10-point scale) for three main reasons: interpretability for managerial decision-making, robustness to extreme outliers, and scalability for comparisons involving more than three enterprises (in such cases, intermediate values of the scale are applied).

A clear distinction between positive and negative metrics is essential to ensure the validity of the assessment. While higher values indicate better performance for metrics such as traffic volume or Authority Score, the opposite applies to indicators such as Bounce Rate, INP, and TTFB, where lower values correspond to superior outcomes and should therefore receive higher scores. Failure to account for this distinction results in a systematic bias in the comparative evaluation.

The Integrated Digital Presence Index (DPI) enables the ranking of enterprises according to their overall level of digital presence, identification of strengths and underperforming areas relative to

competitors, determination of priority directions for investment in digital development, and tracking of performance dynamics over time, provided that the assessment is conducted regularly.

Methodological Limitations and Application Conditions The proposed methodology is subject to three systemic limitations that should be considered during its application.

First, the data obtained from open analytical platforms represent estimated values rather than exact figures, particularly for websites with low traffic volumes. For validation purposes, it is advisable to cross-check SimilarWeb data with internal Google Analytics data, where available.

Second, the 5-3-1 ranking principle is based on relative comparison, meaning that the results depend on the composition of the comparison group. Accordingly, the careful selection of competitors at both benchmarking levels is critical.

Third, several key performance indicators, including the conversion rate (CR), customer acquisition cost (CAC), and return on advertising spend (ROAS), are commercially sensitive and not publicly available. This constitutes a general limitation of external digital presence audits and applies to all methodologies based on open data sources.

The methodology is most suitable for large and medium-sized enterprises with a well-developed digital presence in sectors characterised by relatively transparent market data, such as e-commerce, retail, and B2C services. For small enterprises or niche markets, it is recommended to complement this approach with primary qualitative research methods.

Conclusions. This article develops a comprehensive methodology for assessing digital presence of e-commerce and retail enterprises, addressing the relevant scientific and practical problem of the absence of an integrated system for measuring competitive positions in the digital environment, based on publicly available analytical data.

The scientific contribution of this study is reflected in the following results. First, based on a critical analysis of four existing approaches (technological, marketing, index-based, and strategic), an original integral definition of enterprise digital presence is proposed, emphasising its dynamic nature, the role of measurability as a constitutive characteristic, and the equal importance of the technical dimension with marketing and social components. Second, a four-dimensional structure is substantiated, encompassing technical (Core Web Vitals), search (SEO/PPC), behavioural, and social dimensions, each supported by corresponding KPI systems and analytical tools. Third, a three-block methodology (audit, two-level benchmarking, and 5-3-1 scorecard) is developed, which, unlike existing approaches, systematically integrates all four dimensions into a unified assessment framework tailored to the e-commerce and retail sectors.

The practical value of the methodology is determined by three key attributes: scalability (applicability across enterprises of different sizes and sectors), reproducibility (reliance exclusively on open analytical platforms), and strategic relevance (direct translation of results into priorities for investing in digital development).

Directions for further research include the empirical validation of the methodology on a representative sample of e-commerce and retail enterprises, the development of industry-specific weighting coefficients for KPIs, and the extension of the KPI system to incorporate metrics related to mobile applications and omnichannel integration.

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