# Diagnostics of the maturity of the social media ecosystem of educational services providers – perspective of social security

Yanina Lisun[1], Sabina Sanetra-Półgrabi[2]

[1]Kyiv National University of Trade and Economics,
*Ukraine*

[2]Uniwersytet Komisji Edukacji Narodowe,
*Polska*

***Abstract*— The essence of the ecosystem of social media of educational service providers (HEIs, digital educational platforms) is studied. The essence of the maturity of the ecosystem of social media of educational service providers is considered. A scientific and methodological approach to assessing the level of maturity of the ecosystem of social media of educational service providers and the implementation of the marketing function in them is proposed, which is based on the use of combinations of rank and comparative analysis of certain groups of indicators: website, social networks and digital marketing channels.**

**To assess social networks (Facebook, Instagram, X (Twitter), YouTube, LinkedIn) of an educational service provider, it is proposed to use normative values established according to the Unirank rating. This made it possible to determine the degree of compliance of the actual number of subscribers in a particular social network of a particular educational service provider with the desired value (the average world level of the number of subscribers for educational institutions, according to the Unirank rating, as of 2024).**

**A methodology is proposed for determining a general indicator of the maturity of the social media ecosystem of an educational service provider, which takes into account a weighted assessment of the website, an assessment of the balance of digital marketing channels (direct visits, organic search, paid search, referrals, digital advertising, social networks, E-mail), and an assessment of social networks. A quantitative assessment is calculated for each component of the ecosystem. A general indicator of the maturity of the social media ecosystem of an educational service provider is calculated, its quantitative value and qualitative interpretation are presented, according to the Harrington scale.**

**The obtained results of the maturity of the social media ecosystem are used to identify the social media marketing strategy of the educational service provider, according to the matrix developed by the author. The results of the study are presented for leading higher education institutions of Ukraine, Poland, Germany, and global digital educational platforms. Overall, the study illustrates the results of testing the proposed methodology for 16 educational service providers.**

**Keywords— ecosystem, social media, website, social networks, educational service providers, ecosystem maturity, positioning strategies, social media interaction strategies, effectiveness, efficiency.**

## I. INTRODUCTION

The ecosystem approach is actively used in all areas of scientific knowledge: economics, sociology, pedagogy, media sciences. Educational service providers, in particular higher education institutions, global digital educational platforms function and occur as a social phenomenon due to the totality of participants who feel the need for knowledge and development (demand for educational content, services) and thereby determine the production of an educational product (supply of educational services, educational content). Like any economic system, the activities of educational service providers take into account the costs and price of educational services. The functioning of such a system is built in compliance with the principles of effectiveness and efficiency of economic activity.

At the same time, modern pedagogy and education exist in the digital environment, digital technologies, social networks. Almost every direct participant in the educational process (student, teacher) has accounts in social networks. Educational institutions, from kindergartens to higher education institutions and global digital educational platforms (Coursera, Udemy, etc.) have official websites and accounts in social networks. Therefore, not only the «classic» offline activities of education providers are becoming increasingly relevant, but also the

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digital activities, presence and positioning of educational market entities.

We are talking about the social media ecosystem of educational service providers. The maturity of the social media ecosystem of educational service providers is the level of development, sustainability and effectiveness of interaction between various participants in the ecosystem, such as educational platforms, teachers, students, content makers, technology companies and advertisers. The main characteristics of a mature ecosystem are: developed infrastructure, diversity and quality of content, effective interaction of participants, monetization and financial sustainability, regulation and security.

Obviously, each educational service provider will have its own unique social media ecosystem. The differences may lie in the structure and characteristics of the educational services provider's website. Universities in Ukraine have one official website (with an extensive system of tabs and pages), while universities in European countries may have a network of official websites that make up its holistic structure. For example, an international faculty may have a separate website associated with the main university website. At the same time, each website of a higher education institution differs in architecture, technical characteristics, coverage, content specificity, design, corporate style, etc.

The next integral component of the educational services provider's social media ecosystem, in addition to the website, are social networks. The most famous social networks remain YouTube, Instagram, Tik-Tok, X (Twitter), LinkedIn, Facebook. Different social networks differ in the purpose and preferences of the target audience, which has its own age and gender characteristics. Generation Z prefers Instagram, Tik-Tok, the Millennial generation uses Facebook more often. There are also differences in the purpose of social networks. For example, YouTube is used for video content (especially large format), and for work and business it is advisable to have a profile on LinkedIn.

If we compare social networks of higher education institutions of different countries, we can also find a number of differences. In the UK and the European Union, X (Twitter) is actively used, while in Ukraine this social network is less popular in everyday life and in the field of education. Leading universities in the UK maintain their accounts in social networks that are popular in China (Weixin, Sina Weibo, Kuaishou, Douyin, Baid U Tieba, You Ku). This is explained by the fact that a significant number of students from China study at UK universities.

The differences are manifested in the technical and personnel support for the proper condition of websites and social networks. Higher education institutions can have both a limited and extensive staff of IT specialists and SMM specialists. Some leading universities in Germany have a staff of 5-7 SMM specialists. In Ukrainian universities, the responsibilities of managing social networks are mainly assigned to scientific and pedagogical staff, which is explained by the lack of funding.

Demographic, economic, technological, cultural, political and legal factors in each country that determine the market conditions for educational services remain important. Global digital educational platforms are multicultural systems that have their own specifics (extensive website, wider possibilities for using high-value adaptive educational technologies, artificial intelligence, the need to maintain a multilingual educational environment, etc.).

## II. ANALYSIS OF RECENT RESEARCH

The fragmentation of the social media ecosystem is underway, providing a methodological framework for defining the role of different platforms in the United States. Four mainstream (Facebook, Twitter, Reddit, YouTube) and five alt-tech fringe platforms (BitChute, Gab, Parler, Scored, Voat) are studied (Edoardo Di Martino, Alessandro Galeazzi, Michele Starnini, Walter Quattrociocchi, Matteo Cinelli, 2024). Edoardo Di Martino, Alessandro Galeazzi, Michele Starnini, Walter Quattrociocchi, Matteo Cinelli define three axes to characterize platform roles: centrality (central vs. peripheral), news consumption (reliable vs. questionable content), and user base composition (uniform vs. diverse). In this context, authors adopt the terms mainstream and alt-tech.

Researchers studying the TripAdvisor service note its transformation and the formation of its service ecosystem, the basis of which is constantly updated data packages that create a complementarity effect. The transformation of the service is noted in three stages, such as: a search engine, a social media platform and an ecosystem of integrated services (Alaimo, Cristina, Kallinikos, Jannis and Vallderama-Venegas, 2019).

The ecosystem of social networks is studied from the perspective of its impact on the implementation of small business strategies. The need to study social media using an ecosystem approach is due to the need to organize it in order to eliminate confusion when using social media among businesses, especially in developing countries (Shirumisha C. Kwayu, 2020).

Richard Hanna, Andrew Rohm, Victoria L. Crittenden. offer a systematic way to understand and conceptualize online social networks as an ecosystem of related elements that include both digital and traditional media. The social media ecosystem is interpreted as a set of interacting components, such as: Your company (Chats, Email, forums, presence, blogs, podcasts, IM, Wiki's, video, events); Social Networks; Social Media Tools; social Networks; Presence; Blogosphere; Wikies; Photo & Video Sites; Event Tools (online); Event Tools (offline); Customers, Partners, Competitors. The authors will provide examples of benchmarking on the use of social networks to reach an important audience of young consumers. Attention is also paid to the strategic integration of social networks into the marketing communications strategy of the firm (Richard Hanna, Andrew Rohm, Victoria L. Crittenden, 2011), (Schultz, 2007).

Kevin Nelsen notes that, «the social media ecosystem is the network of platforms, content, strategies, paid ads, and tools your business uses to connect with your audience online. It includes everything from Facebook, Instagram, and LinkedIn to

content calendars, scheduling tools, analytics, and–most importantly–your website. Website is the heart of your ecosystem. Social platforms are the highways bringing traffic to it» (Kevin Nelsen, 2025).

Our research suggests the following composition of the social media ecosystem: website, social networks, digital communication channels (which also include digital advertising) (Lisun Yanina, 2025).

Considering all of the above, research into the social media ecosystem of educational service providers (universities and global educational platforms) is becoming more relevant. Further research is needed to diagnose the maturity of the social media ecosystem of educational service providers and to justify, based on the results obtained, strategies for positioning and interaction in social media.

## III. PRESENTATION OF THE MAIN MATERIAL

Educational service is a systemic complex phenomenon and process that integrates: a special type of consumer value; a useful type of work, a system of knowledge and information; a set of results of the educational process; the result of the work of the pedagogical team; the formation of abilities and skills for work; an idea, knowledge, event, impression as components of a media product. Modern processes of digitalization have changed the form of providing educational services. For modern educational services, the characteristic features in the field of media are: multimedia, cross-media, convergence. Understanding media in the field of education and pedagogy has expanded from a channel for transmitting information to an environment of interaction and learning (Lisun Yanina, 2025).

Given the above, the educational environment from the standpoint of digital marketing and marketing in social networks must take into account the set of conditions, resources, processes and interactions that contribute to learning, upbringing and comprehensive development of the individual. In our opinion, social media marketing in the educational services market should be understood as a system and process of using social media platforms aimed at promoting educational services, attracting students, distributing educational content, strengthening the educational brand, as well as building communities of interested individuals focused on learning and development. The above strengthens the interaction of educational environment subjects through achieving a common goal and consuming a media product as a holistic set of ideas, knowledge, events and impressions.

Social media of educational service providers perform a representative, communication and marketing function. Marketing in social media in the educational services market should be understood as a component of an independent social media ecosystem of an educational service provider. Marketing is integrated into the ecosystem of the educational service provider. The ecosystem of the educational service provider covers the educational process environment, business processes, relationships with institutional structures and other stakeholders based on building mutually beneficial partnerships. It is advisable to build the social media ecosystem of educational service providers according to the principles of dynamism, integration, flexibility, innovation, efficiency and environmental friendliness.

Using an ecosystem approach to social media of educational service providers provides a number of advantages: synergy of interaction is created; value propositions of educational services are more fully formed; integration of various digital platforms occurs; adaptability and speed of response are ensured; loyalty to the educational brand is formed, which contributes to the attraction of new education seekers and other stakeholders; prerequisites are created for the formation of sustainable relationships with the target audience, which contributes to increasing the long-term effectiveness of the educational service provider's offline and online marketing efforts.

The social media ecosystem of an educational service provider forms and is itself the result of the interaction of such components as: the digital infrastructure of the educational service provider; digital skills (basic, specialized) of participants in the educational process and other stakeholders of the educational service provider; media culture of participants; competitive social media environment.

The segmentation of the target audience is of strategic importance for the effective and efficient functioning of the social media ecosystem of an educational service provider. It is advisable to draw up a portrait of the key audience in the following areas: demographic segmentation; refined segmentation by generation (Alpha, X, Y, Z, Millennials); consumer life cycle; psychographic segmentation; segmentation by relationship/business model (B2B, B2C, C2C, B2G,C2B); segmentation by level of digital literacy and media culture. The methodology proposed in this article for diagnosing the maturity of the social media ecosystem of educational service providers involves assessing various aspects of the ecosystem that determine its effectiveness, sustainability and ability to develop (Fig. 1).

The main stages of the methodology for diagnosing the maturity of the social media ecosystem are given below.

**Stage 1**. Determining the components of the ecosystem: website, digital communication channels, social media (social networks). Determining the set of indicators for each component of the ecosystem. The website (ES1 indicator) should be evaluated according to such indicators as efficiency, visibility in the digital space, adaptation to mobile devices, security. Compliance of the website with the criteria for each attribute is evidence of the proper coverage of the website, sufficient duration of the visit, number of pages visited, reduction of the share of users who viewed only one page (Bounce rate).

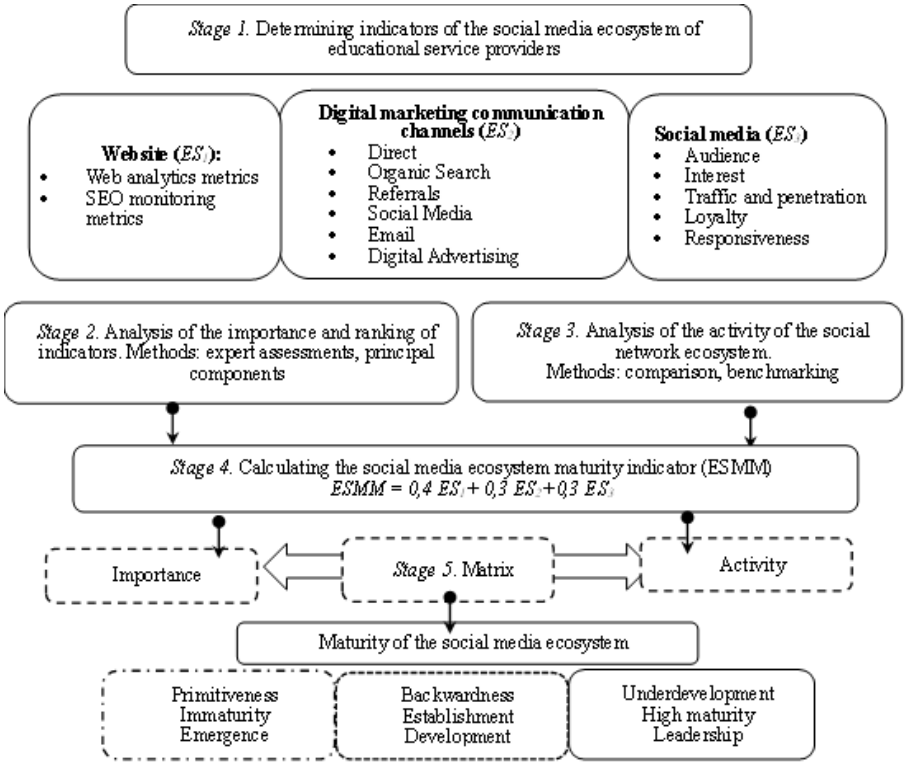
Digital communication channels (ES2 indicator) of the educational service provider are represented by the following types: direct visits, referrals, paid search, digital advertising, social media (networks), e-mail.

Social media (social networks) (ES3 indicator) should be evaluated according to the number of subscribers / reach. These indicators contain an indirect assessment of engagement (likes, comments, shares), because if a user subscribes to an

educational service provider's account on social networks, this indicates their interest and relevance of the content and values of the educational brand broadcast on social media.

**Stage 2**. Data collection to assess the social media ecosystem of an educational service provider primarily involves the use of special analytical tools Hubspot (for website monitoring), SimilarWeb (for diagnosing the presence and functioning of digital marketing channels), Google Analytics, RivalIQ, etc. to diagnose the number of subscribers, posts, likes, etc. The number of subscribers is a basic indicator that indicates the functioning of the social network and interest in it. It is also advisable to use open sources (publications, official reports, user reviews). Conducting surveys among students, teachers and administration of educational service providers.

FIG. 1. SCIENTIFIC AND METHODOLOGICAL APPROACH TO DETERMINING THE LEVEL OF MATURITY OF THE SOCIAL MEDIA ECOSYSTEM OF AN EDUCATIONAL SERVICE PROVIDER




Source: Created by author

**Stage 3**. Quantitative and qualitative assessment. Development of a comparison base and determination of quantitative values for each indicator of the corresponding component of the social media ecosystem of the educational services provider. For the website, as a component of the ecosystem, the comparison base will be the maximum possible score determined using the Hubspot software, which allows for a comprehensive assessment of the website in the following areas: productivity, visibility in the digital environment, adaptation to mobile devices, security.

**Stage 4**. Determination of the general indicator of the maturity of the social media ecosystem (ESMM) of the educational services provider according to the formula (see Fig. 1):

$$ESMM = 0{,}4\ ES_1 + 0{,}3\ ES_2 + 0{,}3\ ES_3, \text{ where}$$

$ES_1$ – evaluation of the educational service provider's website;

$ES_2$ – assessment of the balance of digital marketing channels of an educational service provider;

$ES_1$ – social media assessment of an educational service provider;

Determination of the qualitative interpretation of the obtained values according to the Harrington scale: 1–0,8 «excellent», 0,8–0,63 «good», 0,63–0,37 «satisfactory» 0,37–0,2 – «bad», 0,2-0 – «very bad»

**Stage 5**. The next stage of the methodology is to determine the correlation of importance ranks with the level of activity. This allowed us to build a matrix for determining the maturity of the social media ecosystem of educational service providers and the effectiveness of marketing carried out in it (Table 1).

TABLE 1: MATRIX OF SOCIAL MEDIA ECOSYSTEM MATURITY FOR EDUCATIONAL SERVICE PROVIDERS

| | | | | | | |
|---|---|---|---|---|---|---|
| Importance | Very important | Origin | | Development | | Leadership |
| | Important | Immaturity | | Formation | | High Maturity |
| | Not important | Primitiveness | | Backwardness | | Underdevelopment |
| Strategy type | | Activity | | | | |
| | | Low | | Medium | | High |
| Positioning strategies | | $SP_1$ | $SP_2$ | $SP_3$ | $SP_4$ | $SP_5$ |
| Interaction strategies | | $SI_1$ | $SI_2$ | $SI_3$ | $SI_4$ | $SI_5$ |

Conventional designations of strategy types in Table 1: SP1 – «Monitoring»; SP2 – «Analytical»; SP3 – «Representative»; SP4 – «Active actions»; SP5 –

«Hyperactive actions»; SI 1 – «Listening»; SI 2 – «Expression»; SI 3 – « Stimulation»; SI 4 – «Help»; SI 5 – «Involvement in cooperation». Source: Created by author

The matrix assumes the use of three intervals, but the Harrington scale is based on 5 intervals. Therefore, it is proposed to combine the intervals according to the Harrington scale as follows: 0– 0,36 – «low score», 0,36 – 0,64 – «average score»; 0,64 – 1 – «high score». It is advisable to use the indicated intervals of indicator values to interpret the level of activity of ecosystem components, as well as to interpret the importance of the social media marketing ecosystem.

Let us consider the testing of the methodology proposed by the author on specific data from leading higher education institutions in Ukraine, Poland, Germany and global digital educational platforms. Table 2 shows the initial data by the number of subscribers, and Table 3 presents the assessment of social media providers of educational services.

TABLE 2: NUMBER OF SUBSCRIBERS ON SOCIAL MEDIA OF EDUCATIONAL SERVICE PROVIDERS (2024 DATA)

| Name of the educational service provider | Number of subscribers, thousand | | | | |
|---|---|---|---|---|---|
| | Facebook | Instagram | X (Twitter) | YouTube | LinkedIn |
| | Desired number of subscribers, thousand (according to Unirank rating 2024) | | | | |
| | 50,0 | 18,0 | 14,0 | 20,0 | 50,0 |
| Higher Education Institutions of Ukraine | | | | | |
| Taras Shevchenko National University of Kyiv | 39,0 | 15,3 | n/a | n/a | 68,0 |
| Igor Sikorsky Kyiv Polytechnic Institute | 15,0 | 14,3 | n/a | 7,42 | 2,0 |
| V. N. Karazin Kharkiv National University | 30,0 | 23,4 | n/a | 5,65 | n/a |
| Lviv Polytechnic National University | 23,0 | 17,7 | n/a | 2,42 | 46,0 |
| Higher Education Institutions of Poland | | | | | |
| University of Warsaw | 104,0 | 28,1 | 12,9 | 25,4 | 221.0 |
| Warsaw University of Technology | 7,7 | 17,7 | 0,97 | 28,3 | 133,0 |
| AGH University of Science and Technology | 83,0 | 23,3 | 7,43 | n/a | 116,0 |
| Gdańsk University of Technology | 42,0 | 13,7 | n/a | 9,47 | 74,0 |
| Higher Education Institutions of Germany | | | | | |
| Technical University of Munich | 59,0 | 87,8 | 53,2 | 25,4 | 351,0 |
| Heidelberg University | 61,0 | 37,5 | n/a | 28,3 | 109,0 |
| LMU Munich | 101,3 | 69,2 | 44,9 | n/a | 207,0 |
| Karlsruhe Institute of Technology | 43,0 | 32,4 | n/a | 9,47 | 155,0 |
| Global digital educational platforms | | | | | |
| Name of the educational service provider | Desired number of subscribers, million (empirical values) | | | | |
| | 1,85 | 0,700 | 0,550 | 0,750 | 1,85 |
| Edx.org | 1,6 | n/a | 0,334 | n/a | 0,428, |
| Udermy.com | 8,4 | 3,4 | 0,239 | 0,304 | 2,0 |
| Coursera.org | 2,1 | 0,711 | 0,492 | 0,286 | 2,0 |
| Alison.com | 0,739 | 0,869 | 29,3 | 0,879 | 0,214, |

Source: Created by author

To assess the social networks of the educational service provider as a component of the ecosystem, we will take the following values: Facebook – 50 thousand followers Instagram – 18 thousand followers; X (Twitter) – 14 thousand followers; YouTube – 20 thousand followers; LinkedIn 50 thousand followers. The values for Facebook, Instagram, X (Twitter) – are set according to Unirank data for 2024 (this indicator increases every year). The values for YouTube and LinkedIn are determined empirically according to 2024 data. It is also useful to analyse trends and predict the dynamics of indicators.

The results of the research showed that not all educational service providers use the social networks indicated in Table 2. In particular, the studied HEIs of Ukraine almost do not use X (Twitter). For example, the number of subscribers in this social network is sometimes less than 100 people. Also, V. N. Karazin Kharkiv National University does not use LinkedIn (2024 data), which may be due to limited resources and Russia's military actions against Ukraine.

TABLE 3: ASSESSMENT OF SOCIAL MEDIA AS A COMPONENT OF THE ECOSYSTEM OF EDUCATIONAL SERVICE PROVIDERS (2024 DATA)

| Name of the educational service provider | Name of social media (social networks) | | | | | Assessment of social networks as a component of the ecosystem SMM | |
|---|---|---|---|---|---|---|---|
| | Facebook | Instagram | X (Twitter) | YouTube | LinkedIn | Facebook, Instagram, X, YouTube, LinkedIn, | Facebook, Instagram, LinkedIn |
| Higher Education Institutions of Ukraine | | | | | | | |
| Taras Shevchenko National University of Kyiv | 0,78 | 0,85 | n/a | n/a | 1,0 | 0,53 | 0,87 |
| Igor Sikorsky Kyiv Polytechnic Institute | 0,3 | 0,79 | n/a | 0,37 | 0,04 | 0,3 | 0,37 |
| V. N. Karazin Kharkiv National University | 0,6 | 1,0 | n/a | 0,28 | n/a | 0,44 | 0,53 |
| Lviv Polytechnic National University | 0,46 | 0,98 | n/a | 0,12 | 0,92 | 0,50 | 0,79 |
| Higher Education Institutions of Poland | | | | | | | |
| University of Warsaw | 1,0 | 1,0 | 0,92 | 1,0 | 1,0 | 0,98 | 1,0 |
| Warsaw University of Technology | 0,15 | 0,98 | 0,06 | 1,0 | 1,0 | 0,64 | 0,71 |
| AGH University of Science and Technology | 1,0 | 1,0 | 0,53 | n/a | 1,0 | 0,71 | 1,0 |
| Gdańsk University of Technology | 0,84 | 0,76 | n/a | 0,47 | 1,0 | 0,61 | 0,87 |
| Higher Education Institutions of Germany | | | | | | | |
| Technical University of Munich | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 |
| Heidelberg University | 1,0 | 1,0 | n/a | 1,0 | 1,0 | 0,80 | 1,0 |
| LMU Munich | 1,0 | 1,0 | 1,0 | n/a | 1,0 | 0,80 | 1,0 |
| Karlsruhe Institute of Technology | 0,86 | 1,0 | n/a | 0,47 | 1,0 | 0,80 | 0,95 |
| Global digital educational platforms | | | | | | | |
| Edx.org | 0,86 | n/a | 0,61 | n/a | 0,23 | 0,22 | 0,36 |
| Udermy.com | 1,0 | 1,0 | 0,43 | 0,41 | 1,0 | 0,77 | 1,0 |

| Name of the educational service provider | Name of social media (social networks) | | | | | Assessment of social networks as a component of the ecosystem SMM | |
|---|---|---|---|---|---|---|---|
| | Facebook | Instagram | X (Twitter) | YouTube | LinkedIn | Facebook, Instagram, X, YouTube, LinkedIn, | Facebook, Instagram, LinkedIn |
| Coursera.org | 1,0 | 1,0 | 0,89 | 0,38 | 1,0 | 0,98 | 1,0 |
| Alison.com | 0,40 | 0,12 | 0,05 | 0,11 | 0,12 | 0,16 | 0,22 |

Source: Created by author

As of 2024, X (Twitter) was also not used by Gdańsk University of Technology (Poland), Karlsruhe Institute of Technology (Germany). YouTube is not used on 2024 by the AGH University of (Poland), LMU Munich (Germany). Therefore, Table 3 shows two calculation options: for all social networks (for some HEIs this leads to an underestimation of indicators, since some social networks are absent) and the second calculation option – only for Facebook, Instagram and LinkedIn.

To assess digital marketing channels as a component of the social media ecosystem of educational service providers (see Fig. 1), it is advisable to use the following values, which are determined using SimilarWeb software: direct visits (49,6%); organic search (43,2%); referrals (2,09%); paid search (0,03%); digital advertising (0,07%); social media (networks) (2,8%); e-mail (1,16%). The recommended values are determined based on benchmarking data from the studied HEIs. For global digital educational platforms, these indicators may differ slightly.

In general, we can note that in the studied HEIs in all countries (Ukraine, Poland, Germany) such channels as: «direct visits» and «organic search» prevail. The share of traffic from direct visits to HEIs in Ukraine is 35–40%; in Poland, Germany – 40–60%.

In Ukrainian HEIs, traffic to the website from organic search is 60–70%; in Polish HEIs, Germany – slightly less (40–60%).

Social networks, as a digital channel of marketing communications, provide insignificant traffic compared to direct visits and organic search. Traffic to the website from social networks for Ukrainian HEIs ranges from 1 to 2,6% in 9 out of 10 studied HEIs. The exception is V. N. Karazin Kharkiv National University – 10,29% of traffic to the website is provided by social networks. Lviv Polytechnic National University, Kyiv-Mohyla Academy National University, and the State University of Trade and Economics are characterized by traffic from social networks at the level of 3–4%.

An effective tool of digital marketing is online advertising, but the studied Ukrainian HEIs almost do not use it, which is explained by the lack of financial resources. The exception is the Igor Sikorsky Kyiv Polytechnic Institute – 0,23% of traffic to the website is provided by online advertising; and Ivan Franko Lviv National University – 0,15% of traffic.

If we talk about online advertising in HEIs in Poland and Germany, the traffic provided by this channel of marketing communications is insignificant 0,05–0,1%. However, almost all HEIs in Poland and Germany use online advertising. It is also necessary to take into account the differences in the total traffic of the HEI website, depending on the country (Poland and Germany have much higher indicators).

It is advisable to evaluate a website according to such indicators as efficiency, visibility in the digital space, adaptation to mobile devices, security. The Hubspot digital platform was used in the calculations.

Table 4 presents the results of the evaluation of the components of the social media marketing ecosystem of calculations, as well as a general assessment of the social media ecosystem of educational service providers.

TABLE 4: EVALUATION OF THE COMPONENTS OF THE SOCIAL MEDIA MARKETING (SMM) ECOSYSTEM OF EDUCATIONAL SERVICE PROVIDERS

| Name of the educational service provider | Components of the social media ecosystem | | | General assessment of the ecosystem ESMM | Qualitative assessment of the ESMM ecosystem using the Harrington scale |
|---|---|---|---|---|---|
| | Web site (ES1) | Digital communication channels ($ES_2$) | Social networks ($ES_3$) | | |
| Higher Education Institutions of Ukraine | | | | | |
| Taras Shevchenko National University of Kyiv | 0,200 | 0,153 | 0,261 | 0,48 | Satisfactory |
| Igor Sikorsky Kyiv Polytechnic Institute | 0,272 | 0,219 | 0,112 | 0,66 | Good |
| V. N. Karazin Kharkiv National University | 0,232 | 0,234 | 0,159 | 0,45 | Satisfactory |
| Lviv Polytechnic National University | 0,244 | 0,171 | 0,237 | 0,58 | Satisfactory / Good |
| Higher Education Institutions of Poland | | | | | |
| University of Warsaw | 0,260 | 0,261 | 0,300 | 0,82 | Excellent |
| Warsaw University of Technology | 0,312 | 0,201 | 0,213 | 0,73 | Good |
| AGH University of Science and Technology | 0,348 | 0,243 | 0,300 | 0,89 | Excellent |
| Gdańsk University of Technology | 0,260 | 0,222 | 0,261 | 0,75 | Good |
| Higher Education Institutions of Germany | | | | | |
| Technical University of Munich | 0,336 | 0,261 | 0,300 | 0,92 | Excellent |
| Heidelberg University | 0,284 | 0,201 | 0,213 | 0,78 | Good |
| LMU Munich | 0,316 | 0,243 | 0,300 | 0,83 | Excellent |
| Karlsruhe Institute of Technology | 0,288 | 0,222 | 0,261 | 0,81 | Excellent |
| Global digital educational platforms | | | | | |
| Edx.org | 0,276 | 0,224 | 0,260 | 0,76 | Good |
| Udemy.com | 0,354 | 0,264 | 0,302 | 0,92 | Excellent |

| Name of the educational service provider | Components of the social media ecosystem | | | General assessment of the ecosystem ESMM | Qualitative assessment of the ESMM ecosystem using the Harrington scale |
|---|---|---|---|---|---|
| | Web site (ES1) | Digital communication channels ($ES_2$) | Social networks ($ES_3$) | | |
| Coursera.org | 0,337 | 0,240 | 0,303 | 0,88 | Excellent |
| Alison.com | 0,273 | 0,218 | 0,259 | 0,75 | Good |

Source: Created by author

According to the results of the diagnostics, the social media ecosystem of Ukrainian HEIs is characterized by the ratings of «satisfactory», «good». In particular, the rating of «good» was received by Igor Sikorsky Kyiv Polytechnic Institute, as well as Lviv Polytechnic National University, which is close to this level. According to the proposed methodology, the obtained ecosystem ratings correspond to the average and high level of activity (see Table 5).

TABLE 5: EVALUATION OF THE COMPONENTS OF THE SOCIAL MEDIA ECOSYSTEM / SOCIAL MEDIA MARKETING (SMM) ECOSYSTEM OF EDUCATIONAL SERVICE PROVIDERS

| Name of the educational service provider | Social media ecosystem assessment | Social media ecosystem assessment according to the Haringt on scale | Social media activity level | Social media importance level | Social media ecosystem maturity level |
|---|---|---|---|---|---|
| Higher Education Institutions of Ukraine | | | | | |
| Taras Shevchenko National University of Kyiv | 0,48 | Satisfactory | Medium | Important/ Very important | Formation/ development |
| Igor Sikorsky Kyiv Polytechnic Institute | 0,66 | Good | High | Important/ Very important | High Maturity |
| V. N. Karazin Kharkiv National University | 0,45 | Satisfactory | Medium | Important/ Very important | Formation/ development |
| Lviv Polytechnic National University | 0,58 | Satisfactory / Good | Medium | Important/ Very important | Formation/ development |
| Higher Education Institutions of Poland | | | | | |
| University of Warsaw | 0,82 | Excellent | High | Very important | Leadership |
| Warsaw University of Technology | 0,73 | Good | High | Important/ Very important | High Maturity |
| AGH University of Science and Technology | 0,89 | Excellent | High | Very important | Leadership |
| Gdańsk University of Technology | 0,75 | Good | High | Important/ Very important | High Maturity |
| Higher Education Institutions of Germany | | | | | |
| Technical University of Munich | 0,92 | Excellent | High | Very important | Leadership |
| Heidelberg University | 0,78 | Good | High | Very important | High Maturity |
| LMU Munich | 0,83 | Excellent | High | Very important | Leadership |
| Karlsruhe Institute of Technology | 0,81 | Excellent | High | Very important | Leadership |
| Global digital educational platforms | | | | | |
| Edx.org | 0,76 | Good | High | Very important | High Maturity |
| Udermy.com | 0,92 | Excellent | High | Very important | Leadership |
| Coursera.org | 0,88 | Excellent | High | Very important | Leadership |
| Alison.com | 0,75 | Good | High | Very important | High Maturity |

Source: Created by author

According to the results of the study, it was determined that Ukrainian HEIs, for which the diagnostics were conducted, are aware of the importance of social media marketing management, therefore the degree of importance was assessed as «very important». All of the above allows us to identify the degree of ecosystem maturity as follows: Taras Shevchenko National University of Kyiv, V. N. Karazin Kharkiv National University, Lviv Polytechnic National University – the degree of maturity of the social media ecosystem – «development»; Igor Sikorsky Kyiv Polytechnic Institute – the degree of maturity of the social media ecosystem – «leadership».

Polish HEIs, which were diagnosed, are aware of the importance of social media marketing management, therefore the degree of importance was assessed as «very important», «important». All of the above allows us to identify the degree of ecosystem maturity as follows: University of Warsaw, AGH University of Science and Technology – degree of social media ecosystem maturity – «leadership»; Warsaw University of Technology, Gdańsk University of Technology – degree of social media ecosystem maturity – «high maturity» (see Table 5).

German HEIs are characterized by the following ecosystem assessments: Technical University of Munich, LMU Munich, Karlsruhe Institute of Technology – degree of social media ecosystem maturity – «leadership»; Heidelberg University – degree of social media ecosystem maturity – «high maturity».

Global digital educational platforms differ in normative (desirable) values of indicators, compared to HEIs (see Table 2). However, the proposed methodology for ecosystem diagnostics is universal and can be applied to any provider of educational services. Global digital educational platforms Edx.org, Alison.com are characterized by ecosystems with high maturity. Global digital educational platforms Udermy.com, Coursera.org are characterized by ecosystems at the leadership stage (see Table 5).

The maturity of an educational service provider's social media marketing ecosystem determines its level of development, effectiveness, and integration of digital communications into the educational service provider's overall branding strategy and audience engagement.

The maturity levels of the social media marketing ecosystem can be generally described as follows. *Initial level* (*emergence*): social networks are conducted chaotically, without coordination of the behaviour strategy; there is no content plan, communication is characterized by irregularity, episodicity; interaction with the audience is minimal, feedback is almost absent. Characteristic features are as follows: small social media audience (social networks / blogs), low activity, unstable social media business model of the educational services provider.

*The developing level (formation)* is characterized as follows: the main platforms are identified (for example, Facebook, Instagram, LinkedIn); a content plan is formed in the higher education institution, regular publication of posts is carried out. At the same time, responses to comments and messages are carried out, but without a clear strategy; basic analytical tools are used. The characteristic features are as follows: user growth, the emergence of the first active communities, development of monetization tools.

*Optimized level (advanced level):* there is a clear SMM strategy, developed in accordance with the goals of the educational institution. The higher education institution creates and uses a variety of content (video, podcasts, visual materials, interactive); active interaction with subscribers, community management and UGC (User Generated Content) are implemented; targeted advertising is used to attract a new audience. Analytical procedures are implemented on an ongoing basis, and the strategy is adjusted.

*Integrated level (high maturity):* social media marketing is fully integrated into the overall marketing strategy of the educational institution; automated services are used for publishing, analysis and communication (e.g. chatbots, AI analytics). The HEI uses a developed CRM system to track communications with potential students and partners. Sophisticated analytical models are used to predict the effectiveness of content.

*Innovation level (leadership):* the educational service provider becomes a thought leader in its field, communicates with the target audience through social networks. The higher education institution has created its own digital platforms for communication (forum, online courses, podcasts, etc.). Also, the maturity of the social media ecosystem is characterized by the use of AR/VR, interactive technologies, gamification; active partnerships with influencers, alumni and business. The strategy changes based on artificial intelligence data. The characteristic features are: a stable large user base, differentiated sources of income, integration with other digital platforms.

Since the study used an ecosystem approach, the possible state of development of social media *is as decline*, characterized by possible stagnation, a drop in activity due to competition, or changing trends.

## IV. CONCLUSIONS AND PERSPECTIVES FOR FURTHER RESEARCH.

When diagnosing the social media ecosystem, it is advisable to analyse social dynamics and engagement; the number and dynamics of active users (DAU, MAU). The frequency and depth of interaction (average number of comments, likes, reposts) are important. An important indicator is the time spent on the platform, the ratio of new and regular users.

The time spent on social networks and the website determines, among other factors, the relevance of content. It is advisable to analyse the percentage of user and commercial content, the level of uniqueness and originality of content. Algorithms for combating fake news, trolling, and disinformation are of strategic importance.

The technological stability and security of the social media ecosystem is characterized, first of all, by the speed of loading, data security. The policy of data security and confidentiality, protection against bots, fake accounts, and cyberattacks are important.

The stage of development of the social media ecosystem also needs to be analysed from a financial perspective, in particular, monetization and the business model of interaction with the target audience should be investigated. Possible sources of income are advertising, subscriptions, partnerships. The share of active paid users (paid participation in conferences, workshops) can serve as an indicator of monetization, which is most relevant for global digital educational platforms. Subscriptions, one-time payments for courses. freemium model (free basic content combined with paid advanced features). Partner programs and sponsorship deserve attention.

Further development and functioning of the social media marketing ecosystem should be considered in terms of integration and external relations, API integrations with other services. Cooperation with other educational brands, sports organizations, publishing houses, media, and government agencies is important.

The infrastructure of the social media ecosystem of educational service providers is gaining strategic importance, as it is a set of technological, organizational and content components that ensure effective interaction of educational

platforms, teachers, students and other stakeholders in the digital space. The key components of such infrastructure are: technological support, integration with social media, integration with content and teaching methods. The technological component is: cloud services for data storage and processing, platforms for online courses (Coursera, Udemy, Prometheus, etc.), video hosting (YouTube, Vimeo, Zoom for webinars), CRM systems and LMS (Learning Management Systems).

Social media integration into the activities of an educational service provider means using Facebook, Instagram, LinkedIn, TikTok, etc. to promote educational services. Groups, chats and forums on Telegram, Discord, WhatsApp can also be used for communication. Effective are platforms for creating communities (educational blogs) and interaction between students and teachers

A developed social media ecosystem of an educational service provider means the presence of high-quality platforms for learning and communication (e.g. Coursera, Udemy, YouTube, TikTok, LinkedIn Learning). Integration with artificial intelligence and analytics for personalizing learning is important. Content diversity and quality consists in the availability of a wide range of educational materials for different levels of complexity and formats (videos, articles, podcasts, interactive courses). The content meets modern educational trends and quality standards. Effective interaction of participants means that teachers and content makers actively interact with the audience through comments, live broadcasts and communities. Students can discuss materials, share experiences and receive feedback. Monetization and financial sustainability means that providers can earn through advertising, subscriptions, donations, certificates or corporate programs. The presence of a clear business model ensures the stability of development.

The regulation and security of the social media ecosystem of educational service providers consists of respecting copyright and academic integrity, protecting users' personal data, filtering misinformation and low-quality content. Innovation and adaptability mean using artificial intelligence for automated learning and content personalization, and quickly responding to changes in educational needs and technological trends.

If the social media ecosystem of educational service providers meets these criteria, it can be considered mature. If it is in the initial stages of development, then challenges such as a lack of quality content, weak interaction between participants, or limited monetization opportunities are possible.

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