



28th European Conference on Artificial Intelligence (ECAI 2025)

ASSESSMENT OF THE USE OF MODERN ONLINE COMMUNICATION TOOLS BY UNIVERSITIES TO SHAPE THEIR IMAGE IN THE PERCEPTION OF STUDENTS

Mateusz Juźwik^a

^a University of Szczecin, Institute of Management, Poland

ABSTRACT

Purpose: This study evaluates how internet-based communication tools shape higher-education institutions' images from students' viewpoints, identifying the most potent instruments and contrasting perceptions between public and non-public universities within intelligent management frameworks.

Need for the study: Accelerating digital transformation compels universities to sustain engaging online profiles. While scholarship highlights intelligent management and digital outreach, Polish studies rarely foreground student perspectives. This research addresses that gap by measuring perceived effectiveness of key online channels in university–student communication.

Methodology: Using Computer-Assisted Web Interviewing, we surveyed 383 students from public and non-public universities in Poland's West Pomeranian Voivodeship. Descriptive statistics and the Mann-Whitney U test compared assessments of four tools: institutional websites, social media, e-mail marketing, and SEO/SEM activities.

Findings: University websites were deemed the most influential image-building medium, followed by social media. Students at non-public institutions rated the visual appeal, navigability, and functionality of digital tools more highly than peers at public universities. Perceptions of e-mail marketing and search-engine visibility did not differ significantly between groups.

Practical Implications: Universities should professionalise and regularly refresh their digital touchpoints, prioritising content currency, mobile optimisation, and coherent branding. The greater agility of non-public institutions in adopting contemporary online solutions may confer a strategic edge, signalling to prospective students a forward-thinking, student-centred culture aligned with intelligent management principles.

Keywords: Image management, internet communication tools, higher education institutions,

Jel codes: I23, M31, L82

1. INTRODUCTION

Intelligent management in the era of digital transformation has become a crucial element of organisational strategy, particularly in the context of shaping image and the effective use of modern communication tools. As digitalisation progresses, traditional methods of image management are

evolving towards more advanced, data- and technology-driven approaches (Foroudi et al., 2017). Organisations, including higher education institutions, face the challenge of effectively managing their image in the minds of key stakeholders using sophisticated digital communication tools. Students are regarded as the most important stakeholders of universities, as they are not only recipients of educational services but also active participants in communication processes that influence the perception and reputation of these institutions (Carter & Yeo, 2016). Research has shown that the use of online communication tools such as social media has become an integral component of intelligent image management within organisations. Modern technologies allow not only for faster and more precise targeting of specific audiences but also enable the personalisation of content and interactive engagement, which in turn enhances user involvement. In this context, intelligent image management entails not only the implementation of appropriate tools but also their flexible adaptation to the evolving expectations of students, who increasingly assess the quality of a university through its digital presence and online communication activities (Verhoef et al., 2021). Wójcicka (2010) highlights significant differences between public and non-public universities, particularly in relation to their adopted communication strategies. Public institutions, operating within rigid regulatory frameworks and financed through public funds, may be less agile in responding to dynamic changes in the educational market. In contrast, non-public universities, functioning in highly competitive environments, tend to adopt new technologies and communication strategies more swiftly to effectively attract and retain students' attention. This greater agility among non-public institutions may support more effective implementation of intelligent management, including the use of modern internet-based communication tools, which provides an important context for further research in this area.

Considering these considerations, analysing the use of digital communication tools by higher education institutions from the perspective of students as key stakeholders is not only justified but also essential for understanding the effectiveness of communication strategies in the education sector. The present study addresses this issue, focusing on higher education institutions in the West Pomeranian Voivodeship of Poland.

2. LITERATURE REVIEW

Higher education institutions operate in a highly competitive and rapidly evolving information environment, where the effective shaping of organisational image has become one of the key elements of strategic management (Ivy, 2010). At the outset of any analysis concerning the use of online communication tools for image-building purposes, it is essential to define the concept of image itself within the context of higher education institutions. According to Lafuente-Ruiz-de-Sabando, Forcada, and Zorrilla (2019), a university's image can be understood as an evaluation formed through stakeholders' perceptions, beliefs, ideas, and impressions, which emerge over time because of consistent communication by the institution. This definition underscores the central role of communication and the temporal dimension in shaping image, highlighting its deeply rooted and evolving nature. Ivy (2010), in turn, defines image as a set of associations and expectations formed by students and other audiences based on their experiences and the communicative efforts of the institution. Meanwhile, Alessandri, Yang, and Kinsey (2006) conceptualise image as the sum of impressions a university leaves on its stakeholders through its actions, behaviours, and messaging emphasising the integrated and multi-channel character of image-building as a practical process. An intriguing aspect of image management in higher education involves the notion of a desired image, i.e. the perception that an institution actively seeks to cultivate through deliberate communication and strategic activities. Accordingly, the management of a desired image may be viewed as a process of shaping and controlling stakeholder perceptions in a manner that supports the attainment of the university's strategic goals within a competitive educational environment (Rozwadowska, 2002; Jefkins, 1998). The ongoing digitalisation of communication processes, alongside the development of internet-based tools, offers academic institutions the means not only to streamline internal management operations but also to build lasting and more personalised, engaging, and effective relationships with students (Mergel, Edelman, & Haug, 2019). Contemporary scholarship increasingly highlights the importance of intelligent management,

which integrates modern technology with knowledge management, decision-making, and organisational communication (Davenport & Ronanki, 2018). As noted by Mergel, Edelmann, and Haug (2019), intelligent management in organisations relies on the use of digital technologies including internet communication tools to enhance decision-making processes, increase transparency, and actively engage stakeholders through interactive, multi-channel communication.

Numerous attempts have been made in academic literature to define and operationalise the concept of intelligent management within the context of higher education institutions. Researchers have explored both the conditions necessary for the implementation of modern technological solutions and the outcomes of their application across strategic, operational, and communication-related management domains. Selected studies on intelligent management in higher education institutions are summarised in Table 1.

Table 1. Selected studies on intelligent management in the higher education market

Year	Authors	Key findings
2011	Leja, K.	Identified contradictions in the management of contemporary universities, emphasising the need for intelligent management that integrates both academic tradition and modern managerial approaches.
2015	Bugaj, J., Batko, R., et al.	Analysed management models of Polish universities, highlighting the necessity of adopting intelligent management systems to improve institutional efficiency and competitiveness.
2016	Bartosiewicz, M.	Presented the concept of a “smart university” using the example of the University of Wrocław, analysing strategic development directions in the context of intelligent management and the use of modern technologies.
2024	Krivtsun, A. Lankin, A., Grinchenkov, D., Kushchii, D.	Introduced an intelligent system for managing universities’ international activities, integrating AI technologies to streamline administrative processes and foster international cooperation.
2025	Silva, W. A., Ratten, V., Cassel, G. L., Vendrametto, O., et al.	The study revealed key barriers preventing non-leading Brazilian universities from achieving effective management in the digital era. These include lack of strategic tools for institutional repositioning, insufficient knowledge of the costs and benefits of digitalisation, uncertainty regarding the future of traditional HEI models, difficulties in implementing change, and meeting stakeholders’ needs.

Source: own elaboration.

The works of Leja (2011) and Bugaj, Batko, et al. (2015) focus on the systemic and organisational conditions underpinning the functioning of higher education institutions in Poland, highlighting tensions between the traditional academic model and the increasing demands of a competitive market environment. Their findings suggest the need to transform universities into more flexible and effective organisations, capable of implementing modern management solutions, including information and communication technologies. Bartosiewicz (2016) develops this issue further by introducing the concept of smart universities, which integrates intelligent management with a strategic vision for university development based on digital technologies. The author emphasises the importance of organisational innovation and the implementation of integrated systems supporting both teaching and administrative processes. From an international perspective, Krivtsun, Grinchenkov, Lankin, Kushchii (2023) present the implementation of an intelligent management system in international university collaboration, based on the use of artificial intelligence. Their research confirms that AI technologies can effectively support universities in managing complex processes, enhancing operational performance and the quality of cooperation with external partners. A contemporary view of intelligent management is also presented by Silva et al. (2025), who identified key barriers hindering the effective implementation of dynamic management capabilities within universities. These challenges include not only a lack of strategic tools and knowledge regarding digital transformation but also limited capacity to implement change and uncertainty regarding stakeholder expectations. The authors argue that overcoming these barriers can enable universities not only to manage effectively but also to seize the opportunities afforded by digital transformation.

Considering the literature review, it is evident that intelligent management in higher education extends beyond the mere use of digital technologies; it also encompasses organisational culture, communication strategies, and the institution's capacity for adaptation and learning in a rapidly evolving environment. Within this context, the effective implementation of modern internet communication tools assumes particular significance, as these tools can play a pivotal role in shaping a university's image, strengthening stakeholder relations, and building competitive advantage in the educational market.

Table 2. Selected definitions of online communication tools

Year	Authors	Definition
2013	Wiktor, J. W.	Communication tools that utilise information and communication technologies (ICT) to effectively transmit content, foster relationships, and engage audiences in the online environment.
2014	Tiago, M. T. P. M., Veríssimo, J. M.	A set of digital technologies supporting interactivity, personalisation, and real-time automation of marketing communication with audiences.
2015	Kaczmarek-Śliwińska, M.	Platforms and applications that enable real-time communication, monitoring of public opinion, and the adjustment of message content to the preferences of Internet users.
2017	Chaffey, D., Smith, P. R.	Integrated digital means that facilitate two-way communication between an organisation and its audience through online channels, including websites, e-mail, social media, and applications.

Source: own elaboration.

All the approaches share the view that these tools are rooted in information and communication technologies (ICT), enabling effective, interactive, and individualised content delivery to audiences within the digital environment. Wiktor (2013) emphasises that the principal objective of online communication tools is to foster relationships and engage recipients through the efficient use of ICT, thereby underscoring the relational dimension of communication. Tiago and Veríssimo (2014) highlight the role of these tools in promoting interactivity and automating communication, which allows organisations to deliver real-time, tailored content that meets individual audience needs, while simultaneously streamlining communication processes. Kaczmarek-Śliwińska (2015) broadens this perspective by placing emphasis on real-time engagement, opinion monitoring, and message personalisation. Her definition draws attention to the practical use of such tools in the ongoing management of institutional image and stakeholder relations. Conversely, Chaffey and Smith (2017) adopt a broader, systemic perspective, defining online communication tools as integrated digital resources encompassing websites, e-mail marketing, social media, and applications. The core focus here lies in facilitating two-way communication, thereby strengthening interaction and dialogue between the organisation and its audience. An analysis of these definitions indicates that online communication tools not only support the dissemination of content but also serve a strategic function by enabling organisations to shape their desired image, personalise communications, and monitor stakeholder responses in real time. In view of this, it was deemed essential to identify the most relevant online communication tools used for image-building. A review of the literature was therefore undertaken, which identified key digital tools employed by higher education institutions to engage with stakeholders. The subsequent sections focus on four core areas: websites, social media, e-mail marketing, and search engine marketing (SEO/SEM).

Website

The website constitutes one of the most significant tools of online marketing, enabling institutions to present and promote their offerings, values, and unique attributes. As noted by Ciepał, Miłaszewicz, and Wengel (2017), for many stakeholders the website serves as the first point of contact with the organisation, thereby functioning as a virtual business card. The authors emphasise that it is one of the simplest yet most effective instruments for managing organisational image in the digital sphere.

A similar view is presented by Patil, Shrirao, and Jadhav (2023), who argue that online marketing for any organisation “begins and ends with the website”. However, the effectiveness of a website in image-building depends largely on its design - both in terms of content and

functionality. According to Park, Gretzel, and Sirakaya-Turk (2007), key factors influencing a website's success in shaping image include usability, content currency, responsiveness, visual appeal, and security. A failure to meet these standards may adversely affect the perception of the institution and discourage potential students (Kuzic, Giannatos & Vignjevic, 2010). Analyses of university websites in academic literature confirm their impact on institutional image-building. Lažetić (2018) observed that university websites differ depending on the characteristics of their educational markets, with institutions operating in highly competitive environments more frequently employing advanced branding techniques. Similarly, research by Saichaie and Morpew (2014) found that websites of US universities tend to promote the institution as a place for acquiring professional qualifications rather than intellectual development. Other scholars, such as Štefko, Fedorko, and Bačík (2015), highlight the importance of content currency in cultivating a positive image, while Okushova, Stakhovskaya, and Sharaev (2016) point to the role of visual presentation as a key element of stakeholder communication. Furthermore, studies on website digital accessibility (İşeri, Uyar & İlhan, 2017; Stasiak & Dzieńkowski, 2021) reveal that many universities fail to comply with basic WCAG 2.0 standards, which may negatively affect perceptions of openness and professionalism. Collectively, these findings affirm that a university website serves not only as an information source but also as a vital tool in shaping the institution's image in the minds of students.

Social media

Social media are regarded as one of the key online communication tools that enable universities to dynamically and interactively shape their institutional image. They are defined as applications based on Web 2.0 technology, which allow users to create, exchange, and share content (Kaplan & Haenlein, 2010). From an organisational perspective, social media facilitate both the analysis of stakeholder opinions and behaviours (a passive approach) and active engagement in marketing and public relations activities (Constantinides, 2014). Research indicates that these platforms contribute to enhanced brand recognition, the development of community relations, and increased trust in the institution (Budka et al., 2019; Cheung & Lee, 2010). A crucial aspect of social media utilisation is the identification of opinion leaders, whose role in interpreting and further disseminating information can significantly influence the reach and reception of communication (Dorenda-Zaborowicz, 2012). Studies examining the use of social media by higher education institutions across various countries show that these tools impact not only the promotion of educational offerings but also the effectiveness of student recruitment and the cultivation of relationships with prospective students (Alserr et al., 2011; Popa & Sasu, 2016). Research conducted in Poland demonstrates that Facebook remains the dominant communication channel; however, universities have yet to fully harness the potential of other platforms such as TikTok or Snapchat (Łuczaj et al., 2020; Kisiółek, 2021). Furthermore, barriers to effective social media management have been identified, including the absence of coherent strategy and limited understanding of these tools among staff members (Mazurek et al., 2019). Despite numerous analyses focusing on university presence on social media, the academic literature still lacks research dedicated to assessing the content of communications and their impact on students' perceptions of institutional image.

E-mail marketing

E-mail marketing is a widely used tool of online communication, valued for its convenience, the ability to personalise content, and its effectiveness in reaching target audiences. According to Melekhova (2021), it forms part of an organisation's communication strategy, based on pre-developed contact scenarios with recipients via electronic mail. Hudak, Kianickova, and Madlenak (2017) note that it is the most frequently used instrument of direct marketing on the internet, allowing for audience segmentation and the tailoring of content to specific preferences. Chaffey and Smith (2017) further highlight that a coherent and well-planned e-mail marketing strategy can strengthen stakeholder relationships and support the development of a positive organisational image. Regular, engaging communication with stakeholders through e-mail can contribute not only to the achievement of sales objectives but also to increased engagement and loyalty. Despite its widespread use, the academic literature includes limited research on the impact of e-mail marketing on the image of higher education institutions. Štefko, Fedorko, and Bačík (2015) did not confirm a

statistically significant correlation between the use of this tool and the perceived image of a university. Hartemo (2022) demonstrated that recipient engagement in the communication process enhances the effectiveness of mailing activities, a finding potentially relevant to the higher education sector. Zhytomyrska and colleagues (2022) confirmed that e-mail marketing supports the promotion of educational services and improves student engagement. Conversely, Algryani and Jardani (2023) highlighted the need to educate students in professional e-mail etiquette to improve communication standards. Research by Thomas, Chen, and Iacobucci (2022), although not focused on universities, underlines the necessity of strategically managing the frequency and content of e-mails to avoid overwhelming recipients with promotional content and to enhance message effectiveness. These findings may offer valuable insights for universities seeking to leverage the potential of e-mail marketing for both image-building and communication purposes.

Search Engine Marketing (SEO/SEM)

Search Engine Marketing (SEM) encompasses strategies aimed at increasing the visibility of websites in both organic (SEO – Search Engine Optimisation) and paid search results (PPC – Pay-Per-Click). Nabout, Skiera, Stepanchuk, and Gerstmeier (2012) define SEM as a set of activities intended to improve a website's ranking in search engines, including the identification and implementation of keywords that facilitate high positioning in search engine results pages. Tiwari (2020) confirms that effective SEO optimisation leads to increased website traffic and the attraction of new users. Rayappa (2020) highlights that most website visits originate from search engine results, thereby making SEM a crucial component of any marketing strategy. Enhanced search visibility not only drives traffic but also contributes to a positive organisational image through the “top of mind” effect users are more likely to perceive a highly ranked website as trustworthy and prestigious. Studies on the use of SEM in higher education reveal that these tools can effectively support student recruitment efforts and institutional internationalisation. Popa and Sasu (2016) demonstrated that Google advertising campaigns result in higher website traffic and increased student enrolment. Iddris (2011) noted that low positioning in Google's search results may hinder access to international students, making SEO optimisation an essential aspect of communication strategy. Isadora (2018) emphasises the need for universities to develop content aligned with user search intent and to ensure proper website structure and semantic coherence to achieve improved rankings. Killoran (2013) further adds that strategies such as keyword placement, link building, and competitive website analysis contribute to a site's credibility and reputation. Collectively, these studies indicate that search engine marketing not only enhances web traffic but also positively influences brand recognition and the perceived value of higher education institutions.

Based on a review of the relevant literature, key elements defining specific online communication tools that influence the image of higher education institutions have been identified. The aim of this development is to systematise theoretical knowledge in this field and to indicate which aspects of tools may be considered especially significant in terms of communication effectiveness and relationship-building with stakeholders. A detailed summary of these elements is presented in Table 3.

Table 3. Elements defining specific online communication tools influencing the image of higher education institutions

No.	Proposed element	Basis in the literature
		Website
1.	Visual appeal of the university website	E. Ciepał, B. Miłaszewicz, M. Wengel, Y. Park, U. Gretzel, E. Sirakaya-Turk, G. Okushova, Y. Stakhovskaya, P. Sharaev
2.	Currency and credibility of information on the website	E. Ciepał, B. Miłaszewicz, M. Wengel, R. Štefko, R. Fedorko, R. Bačík,
3.	Access to student reviews and alumni success stories on the website	P. Lažetića

4.	Ease of navigation and intuitive design of the website	E. İşeri, K. Uyar, Ü. İlhan W. Stasiak i M. Dzieńkowski Y. Park, U. Gretzel i E. Sirakaya-Turk R. Štefko, R. Fedorko, R. Bačík
5.	Access to information about academic programmes and teaching staff on the website	K. Saichaie i C.C. Morphew R. Štefko, R. Fedorko, R. Bačík,
Social media		
6.	Regular content updates on social media profiles	D. Buchnowska A. Popa, D. Sasu A. Kisiołek
7.	Visual appeal of graphic and video content on social media profiles	L. Karpenka, E. Rudiene, M. Morkunas, A. Volkov
E-mail marketing		
8.	Regular receipt of university-related information via e-mail	D. Chaffey i P. Smith T. Zhytomyrskiej, I. Zrybniev, N. Romaniuk, I. Havrysh i T. Gorditsy
9.	Personalisation of university e-mails (including recipient's name and surname)	A. Melekhova
Search Engine Marketing (SEO/SEM)		
10.	High ranking in search engine results	F. Iddris N. Isadora

Source: own elaboration.

Based on the analysis of literature, it was determined that the largest number of factors defining internet communication tools concern university websites, which are widely recognised as the primary point of interaction between stakeholders and the institution, as well as serving the function of a virtual showcase (Ciepaj, Miłaszewicz, & Wengel, 2020). A central feature is the visual appeal of the website, which, as noted by Park, Gretzel, and Sirakaya-Turk (2007), has a direct bearing on stakeholders' perception of the organisation. Similar conclusions are presented by Okushova, Stakhovskaya, and Sharaev (2016), who underscore the importance of visual presentation in online communication and reputation management. Furthermore, Ciepaj et al. (2020) argue that a "visually pleasing layout" contributes positively to how an institution is received by its audience. Equally significant is the credibility and currency of the information provided, which serve to reinforce trust in the institution (Štefko, Fedorko, & Bačík, 2015). Lažetić (2018) demonstrated that providing information concerning student and alumni achievements enhances the perceived reliability of a university, particularly among prospective applicants. Another relevant dimension is the ease of navigation and intuitive structure of the website, especially in relation to digital accessibility standards. This aspect is highlighted by İşeri, Uyar, and İlhan (2017) and corroborated by Stasiak and Dzieńkowski (2021). Park et al. (2007) also note the importance of user-friendliness in shaping a favourable institutional image. In the context of social media, empirical studies confirm that the frequency of content updates strengthens engagement between universities and students (Kisiołek, 2021), while users expect access to current news and announcements via these channels (Buchnowska, 2013). Popa and Sasu (2016) establish that social media can facilitate relationship-building with potential students. Furthermore, research by Karpenka, Rudiene, Morkunas, and Volkov (2021) indicates that the visual quality of social media content, including graphics and videos, enhances user engagement and fosters trust in the institution. Regarding e-mail marketing, a well-structured communication strategy may contribute to the development of long-term relationships with stakeholders and the promotion of educational services (Chaffey & Smith, 2017; Zhytomyrska, Zrybniva, Romaniuk, Havrysh, & Gorditsa, 2022). Melekhova (2021) adds that the

personalisation of communication, for example through addressing recipients by name, may strengthen the impact of such campaigns. Finally, a university's high visibility in search engine results, achieved through effective SEO/SEM strategies, is recognised as a crucial factor influencing both traffic to the institutional website and its perceived credibility. Isadora (2018) and Iddris (2011) demonstrate that optimising search engine presence can enhance the university's online reach and support recruitment efforts, particularly on international markets. Given the foregoing findings, it was deemed appropriate to explore how these specific elements of online communication are assessed by students, who are the principal stakeholders of higher education institutions. To date, research has predominantly concentrated on institutional practices in digital communication and their measurable outcomes. However, the student perspective specifically regarding the reception and perceived effectiveness of these tools has not been sufficiently addressed. Bridging this gap is essential for a comprehensive understanding of the role online communication tools play in supporting intelligent management processes within the higher education sector.

3. METHODOLOGY

3.1. Participants

Given the substantial number of students enrolled at higher education institutions in the West Pomeranian Voivodeship (31,758 individuals), it was decided to conduct a non-exhaustive study. In line with the approach outlined by Stanimir (2005), marketing research frequently employs purposive sampling, a method based on subjective selection of units, which enables the collection of representative data while managing resource constraints. Assuming a confidence level of 95%, the minimum required sample size for representativeness was calculated at 380 respondents. Ultimately, the study encompassed 383 students enrolled in higher education institutions within the West Pomeranian region. Among the respondents, women predominated ($n = 272$; 71%), while men accounted for $n = 111$; 29% of the sample. In terms of age, the largest group comprised students aged 21–23 years (55.4%), corresponding to the typical age of those in their second and third year of study in Poland. Other age categories included: 24–26 years (18.8%), 18–20 years (17.2%), 29 years and above (7.0%), and 26–28 years (1.6%). Regarding the type of study programme, 63.4% of participants were enrolled in bachelor's degree programmes, 28.5% in master's degree programmes, 5.5% in integrated master's programmes, and 2.6% in engineering studies. Additionally, an analysis of the type of institution revealed that most students attended public universities (86.7%), while 13.3% were enrolled at non-public institutions.

3.2. Research Protocol and Stimuli

An indirect method of communication with respondents was employed in the study using a questionnaire survey, which was made available in electronic form. The CAWI technique (Computer-Assisted Web Interview) was utilised, enabling participants to complete the questionnaire independently and comfortably, without time pressure and in a setting of their choice. As noted by Mazurek-Łopacińska (2005), this approach not only enhances respondent convenience but also facilitates rapid and efficient access to the target sample. Moreover, the electronic format allows for the immediate recording of responses into a database, significantly streamlining the process of data analysis. The questionnaire was developed based on the findings of a pilot study conducted in January 2024, the purpose of which was to test the clarity of the questions and the functionality of the tool. The final version of the questionnaire used in the main study consisted of an introductory section (informing respondents of the anonymity of their participation and the study's objectives), main questions concerning the assessment of the use of online communication tools by higher education institutions, and a demographic section (gender, age, type of study, year of study, and type of institution). The questionnaire included multiple-choice questions with non-mutually exclusive options, allowing respondents to select answers based on their knowledge and experience. The predominant response format was a five-point scale, modelled on the Likert scale (ranging from “strongly disagree” to “strongly agree”).

3.3. Research Apparatus

The data obtained in the study were analysed using specialised statistical software: IBM SPSS Statistics 29.0, JASP 0.18.2, and IBM AMOS 29.0. This software enabled the execution of both descriptive statistics and advanced statistical modelling, allowing for a comprehensive examination of the dataset.

To summarise respondents' answers to the questionnaire items, descriptive statistics were applied, including arithmetic mean, median, standard deviation, and confidence intervals, which facilitated the identification of overall trends within the data. For nominal variables, a frequency analysis was conducted, allowing for the characterisation of the sample structure and the distribution of responses.

3.4. Analysis of Measurement Data

Prior to commencing the main analysis, the data was verified for completeness and accuracy. No missing data were identified, and all responses were coded in accordance with the assumptions established during the questionnaire design phase. A descriptive analysis was conducted for the closed-ended questions, with particular attention given to responses based on the five-point Likert scale. Subsequently, comparative analyses were undertaken to examine the evaluations of specific elements of online communication between students from public and non-public universities. To this end, the Mann-Whitney U test was applied, enabling the verification of hypotheses regarding statistically significant differences between these groups.

4. RESULTS

The initial stage of the analysis evaluated the significance of various online communication tools in shaping a university's image from the student perspective. Guided by the literature, the author interprets the findings through a broadened conception of intelligent management - one that transcends mere technology adoption to encompass data-informed decision-making, an adaptive organisational culture, strategic communication, and an institutional capacity for continuous learning in a rapidly evolving digital environment. The aim of this phase was to identify the online communication channels that respondents perceive as having the greatest influence on the reputation of academic institutions. This, in turn, made it possible to determine which tools are most frequently used and regarded as the most effective. The results of this comparison are presented in Table 4, which provides a starting point for a more in-depth analysis of the individual components that make up these tools.

Table 4. Assessment of the significance of online communication tools in the process of shaping a university's image (respondents rated each tool on a scale from 1 to 5)

	<i>M</i>	<i>Mdn</i>	<i>SD</i>	<i>Min.</i>	<i>Max..</i>	<i>Q1</i>	<i>Q3</i>
Website	4,31	5	0,99	1	5	4	5
Social media	3,96	4	1,07	1	5	4	5
Search Engine Marketing (SEO/SEM)	3,83	4	1,09	1	5	3	5
E-mail marketing	3,16	3	1,31	1	5	2	4

Source: own elaboration.

Based on the collected data, it is evident that students assigned the highest significance to their university's website, with a mean score of 4.3 and a median of 5. This underscores the website's crucial role as the primary and most reliable source of information. It is perceived as an accessible and trustworthy channel for engaging with the university. Social media received a mean score of 4.0, confirming their important position within the communication process, albeit slightly lower than that of the website. Search engine marketing (SEO/SEM) was rated at 3.8, indicating moderate usefulness likely functioning as a supportive tool that enables students to quickly locate relevant information. The lowest scores were attributed to e-mail marketing, with an average rating of 3.2. This suggests that students perceive this tool as having limited utility in the student-university relationship, with a correspondingly minimal impact on communication with key stakeholders.

An additional analysis was conducted to determine whether the perceived significance of individual online communication tools differed depending on the type of university attended by respondents. This

verification aimed to identify potential discrepancies in the perceived effectiveness of communication tools between students of public and non-public institutions. The findings are presented in Table 5, enabling a comparison of respondents' views and the evaluation of any statistically significant differences.

Table 5. Assessment of the significance of online communication tools – comparison between public and non-public universities (respondents rated each tool on a scale from 1 to 5)

	Public (n = 332)			Non-public (n = 51)			Z	p	r_g
	M	Me	SD	M	Me	SD			
Website	4,3 2	5,0 0	0,9 7	4,2 7	5,0 0	1,1 5	- 0,39	0,69 5	0,02
Social media	3,9 6	4,0 0	1,0 7	3,9 2	4,0 0	1,0 7	- 0,29	0,77 1	0,01
Search Engine Marketing (SEO/SEM)	3,8 3	4,0 0	1,0 9	3,8 2	4,0 0	1,1 1	- 0,04	0,96 9	<0,0 1
E-mail marketing	3,1 2	3,0 0	1,3 3	3,4 1	4,0 0	1,1 2	- 1,36	0,17 4	0,07

Source: own elaboration.

No statistically significant differences were identified between students from public and non-public universities in their evaluation of the significance of individual online communication tools. To deepen the analysis, an assessment was also conducted regarding the application of specific elements comprising each online communication tool, considering the type of university attended by the respondents. The results are presented in Table 6.

Table 6. Assessment of the use of elements comprising individual online communication tools by universities attended by respondents (respondents assessed each element on a scale from 1 to 5)

	M	Mdn	SD	Min.	Max	Q1	Q3
Website							
Currency and credibility of information on the website	3,89	4	0,87	1	5	4	4
Ease of navigation and intuitive design of the website	3,64	4	1,08	1	5	3	4
Access to information about academic programmes and teaching staff on the website	3,67	4	1,02	1	5	3	4
Visual appeal of the university website	3,81	4	0,96	1	5	4	4
Access to student reviews and alumni success stories on the website	3,17	3	1,14	1	5	2	4
Social media							
Regular content updates on social media profiles	3,80	4	0,89	1	5	3	4
Visual appeal of graphic and video content on social media profiles	3,64	4	0,96	1	5	3	4
E-mail marketing							
Personalisation of university e-mails (including recipient's name and surname)	3,28	3	1,18	1	5	2	4
Regular receipt of university-related information via e-mail	3,49	4	1,08	1	5	3	4
Search Engine Marketing (SEO/SEM)							
High ranking in search engine results	3,46	3	0,95	1	5	3	4

Source: own elaboration.

An analysis of the evaluations concerning the use of specific elements of online communication indicates that students rated the timeliness and credibility of information published on university

websites the highest (mean score: 4.0), suggesting a high level of trust in the content provided by academic institutions. This was followed by the visual attractiveness of the website and the regular updating of content on social media platforms – both receiving a mean score of 3.8. Conversely, the lowest ratings were assigned to elements such as access to student opinions and alumni success stories on university websites (mean score: 3.2), as well as the personalisation of e-mail messages (mean score: 3.3). These findings may indicate a need for improvement in these areas of communication, which – despite their potential – do not meet student expectations. Subsequently, the study also analysed differences in the assessment of the use of individual online communication tools depending on the type of university attended by the respondents. Detailed results are presented in Table 7.

Table 7. Assessment of the use of elements constituting specific online communication tools by the university attended by respondents (respondents assessed each element on a scale from 1 to 5)

	Public (n = 332)			Non-public (n = 51)					
	<i>M</i>	<i>Me</i>	<i>SD</i>	<i>M</i>	<i>Me</i>	<i>SD</i>	<i>Z</i>	<i>p</i>	<i>r_g</i>
Website									
Currency and credibility of information on the website	3,87	4,00	0,86	4,02	4,00	0,97	-1,81	0,071	0,09
Ease of navigation and intuitive design of the website	3,58	4,00	1,11	4,08	4,00	0,72	-2,95	0,003	0,15
Access to information about academic programmes and teaching staff on the website	3,61	4,00	1,05	4,02	4,00	0,73	-2,46	0,014	0,13
Visual appeal of the university website	3,78	4,00	0,95	4,02	4,00	0,97	-2,11	0,035	0,11
Access to student reviews and alumni success stories on the website	3,10	3,00	1,14	3,61	4,00	1,08	-2,97	0,003	0,15
Social media									
Regular content updates on social media profiles	3,76	4,00	0,86	4,06	4,00	1,03	-2,93	0,003	0,15
Visual appeal of graphic and video content on social media profiles	3,61	4,00	0,94	3,84	4,00	1,07	-1,99	0,047	0,10
E-mail marketing									
Personalisation of university e-mails (including recipient's name and surname)	3,25	3,00	1,19	3,51	4,00	1,12	-1,37	0,171	0,07
Regular receipt of university-related information via e-mail	3,49	4,00	1,08	3,51	4,00	1,14	-0,19	0,852	<0,01
Search Engine Marketing (SEO/SEM)									
High ranking in search engine results	3,43	3,00	0,95	3,63	4,00	0,89	-1,18	0,240	0,06

Source: own elaboration.

The analysis revealed that the assessment of certain elements of online communication tools differed significantly depending on the type of university attended. Students from non-public higher education institutions assigned higher ratings to the following aspects: visual appeal of the university website (mean 4.0 vs. 3.8; $p < 0.035$), access to student reviews and alumni success stories (3.6 vs. 3.1; $p < 0.003$), ease of navigation and website intuitiveness (4.1 vs. 3.6; $p < 0.003$), and access to information regarding curricula and academic staff (4.0 vs. 3.6; $p < 0.014$). Higher ratings from students at non-public universities were also observed for the regularity of content updates on social media platforms (4.1 vs. 3.8; $p < 0.003$) and the visual and graphic aesthetics of materials published through these

channels (3.8 vs. 3.6; $p < 0.047$). For the remaining assessed elements of online communication - such as the frequency of receiving university-related e-mail communications, personalisation of e-mail messages, and the university's visibility in search engine results - no statistically significant differences were observed between students from public and non-public universities.

5. DISCUSSION

The objective of this study was to assess the use of online communication tools by higher education institutions and their impact on shaping institutional image from the perspective of students. Viewed through the lens of intelligent management, comprehending how these tools strategically influence image-building is vital for universities operating in an increasingly digital and competitive environment. The findings confirm that students attach the greatest importance to the content and presentation of university websites, as reflected in the highest ratings assigned to this tool. An average score of 4.3 and a median of 5 underscore the high level of trust students place in the information provided through this channel, aligning with previous observations by Ciepaj, Miłaszewicz and Wengel (2020), who described university websites as a “virtual business card” and a primary point of contact with stakeholders. Social media and search engine marketing received slightly lower, though still high, ratings, highlighting their growing relevance in institutional communication with younger audiences. These results are consistent with the work of Buchnowska (2013) and Kisiołek (2021), who demonstrated that social media enable ongoing engagement with students, although their full potential often remains underutilised by academic institutions. In contrast, e-mail marketing received the lowest average score (3.2), corroborating trends noted by Hartemo (2022) and other researchers (Zhytomyrska et al., 2022), who observed declining interest in this channel among younger recipients, particularly when communication lacks personalisation and regularity. A significant element of the analysis involved comparing the responses of students from public and private universities. Students from private institutions assigned notably higher scores to the visual and functional aspects of websites, as well as the frequency and aesthetic quality of social media content. This finding supports Wójcicka's (2010) assertion that private universities, operating in highly competitive environments, tend to adopt modern communication strategies more rapidly and thereby implement intelligent management practices more effectively. These differences may stem from greater organisational agility and a stronger focus on achieving market advantage. The practical implications of these findings are substantial. Higher education institutions should invest in the development and optimisation of their websites, ensuring not only up-to-date content, but also visual appeal, clarity and ease of navigation. Social media may serve as a more effective relationship-building tool, provided institutions maintain regular updates and deliver engaging, visually compelling content. Meanwhile, e-mail marketing requires a more personalised approach to meet students' expectations and contribute positively to institutional image.

6. CONCLUSION

The growing importance of online communication in the operations of higher education institutions means that its quality and effectiveness have become key factors shaping students' perceptions of these institutions. The findings of the study conducted in the West Pomeranian Voivodeship confirm that online communication tools play a role in image formation, with students' assessments of these tools differing markedly depending on the type of institution. The highest ratings were given to elements related to the functioning of university websites – particularly their currency, credibility, and visual appeal. Social media also received positive evaluations, especially in terms of the regularity and quality of published content. In contrast, lower scores were assigned to e-mail marketing and SEO/SEM activities, suggesting the need to further tailor these forms of communication to the expectations of younger audiences. Moreover, comparative analysis indicated that private universities were more frequently rated highly in terms of the aesthetics and functionality of their communication channels. This may reflect greater institutional flexibility and a more rapid response to changes in the external environment. Such differences may also suggest

more effective implementation of intelligent management strategies, which consider the needs of students as key stakeholders.

Given that the research was limited to a single region of Poland, the findings should be interpreted within this context. Future research could extend to larger populations and other recipient groups. It would also be valuable to undertake a more in-depth analysis of the content communicated online by universities to obtain a fuller understanding of their strategies and their effectiveness. Moreover, embedding these insights within an intelligent-management framework requires continuously collecting data on student interactions and using analytics to iteratively refine digital strategies. Institutions that treat online communication as a dynamic, feedback-driven process – rather than a static broadcast – will be best positioned to enhance their reputations and sustain long-term competitive advantage. In conclusion, the effective use of online communication tools is no longer merely a matter of promotion but constitutes an integral component of image building and the competitive positioning of higher education institutions.

Funding: Co-financed by the Minister of Science under the “Regional Excellence Initiative”.



Ministry of Science and Higher Education
Republic of Poland

REFERENCES

- Alessandri, S. W., Yang, S., Kinsey, D. F. (2006). An integrative approach to university visual identity and reputation. *Corporate Reputation Review*, 9.
- Algryani, A., Jardani, K. (2023). S Email literacy in higher education institutions: a case study on student-instructor e-mail communication at Dhofar University in Oman. *World Journal of English Language*, 6.
- Alserr, N., Selvam, D., & Woon, L. (2011). Social media as promotional tool in higher education in Malaysia. In: *2011 National Postgraduate Conference*. IEEE.
- Bartosiewicz, M. (2016). The concept of smart university based on the example of the University of Wrocław. *Zeszyty Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 430.
- Bugaj, J., Batko, R., Flasiński, M., Frankowicz, M., Godzwon, Z., Hulicka, M., Jedynak, P., Korporowicz, L., Mania, A., Marek, T., Mika, I., Próchnicka, M., Rybkowski, R., Skarbek, T., Vall, M. (2015). Raport: Modele zarządzania uczelniami w Polsce. Kraków.
- Budka, B., Czarnecka, M., Stefańska, M., Kinielski, G. (2022). Social media engagement in shaping greenenergy business models, *Energies*, 15.
- Buchnowska, D. (2013). Wykorzystanie mediów społecznościowych przez uczelnie wyższe i studentów w świetle badań własnych. *Nauki o Zarządzaniu*, 15.
- Carter, S., Yeo, A. C. M. (2016). Students-as-customers' satisfaction, predictive retention with marketing implications: The case of Malaysian higher education business students. *International Journal of Educational Management*, 30.
- Chaffey, D., Smith, P. R. (2017). *Digital marketing excellence: Planning, optimizing and integrating online marketing (5th ed.)*. Routledge.
- Cheung, C. M. K., Lee, M. K. O. (2011). Customer engagement in an online social platform: a conceptual model and scale development, In: *Proceedings of the International Conference on Information Systems, ICIS*, Shanghai, China, December 4-7.
- Ciepaj, E., Miłaszewicz, B., Wengel, M. (2017). *Marketing internetowy w praktyce*. Wydawnictwo Uniwersytetu Szczecińskiego. Szczecin
- Constantinides, E. (2014). Foundations of social media marketing. *Procedia - Social and Behavioral Sciences*, 148.
- Davenport, T. H., Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96.
- Dorenda-Zaborowicz, M. (2020). Marketing w social media. *Nowe Media. Studia i Rozprawy*, 3.
- Dwivedi, Y. K., Ismagilova, E., Hughes, D. L., Carlson, J., Filieri, R., Jacobson, J., Jain, V., Karjaluoto, H., Kefi, H., Krishen, A. S., Kumar, V., Rahman, M. M., Raman, R., Rauschnabel, P. A., Rowley, J., Salo, J., Tran, G. A., Wang, Y. (2021). Setting the future of digital and social media marketing research: Perspectives and research propositions. *International Journal of Information Management*, 59.
- Foroudi, P., Gupta, S., Nazarian, A., Duda, M. (2017). Digital technology and marketing management capability: Achieving growth in SMEs. *Qualitative Market Research: An International Journal*, 20.

- Hartemo, M. (2022). Conversions on the rise – modernizing e-mail marketing practices by utilizing volunteered data. *Journal of Research in Interactive Marketing*, 4.
- Hudak, M., Kianickova, E., & Madlenak, R. (2017). The importance of e-mail marketing in e-commerce. *Procedia Engineering*, 192.
- Iddris, F. (2011). Search engine optimization (SEO) as digital marketing strategy for internationalization of higher education. In: *The 22nd McGill International Entrepreneurship Conference*, 22-24 August, Halmstad University, Sweden.
- Ivy, J. (2010). Higher education institution image: A correspondence analysis approach. *International Journal of Educational Management*, 15.
- Isadora, N. Search engine optimization (SEO) as digital marketing technique for internationalization in higher education: The case of Oulu University of Applied Sciences. Retrieved from: <https://www.theseus.fi/handle/10024/142502> (15.03.2025).
- İşeri, E., Uyar, K., İlhan, Ü. (2017). The accessibility of Cyprus Islands' higher education institution websites. *Procedia Computer Science*, 120.
- Jeffkins, F. (1998). *Public relations*. Financial Times Prentice Hall. London.
- Kaczmarek-Śliwińska, M. (2015). *Public relations w zarządzaniu sytuacjami kryzysowymi organizacji. Sztuka komunikowania się*. Difin. Warszawa.
- Kaplan, A. M., Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons*, 53.
- Karpenka, L., Rudiene, E., Morkunas, M., Volkov, A. (2021). The influence of a brand's visual content on consumer trust in social media community groups. *Journal of Theoretical and Applied Electronic Commerce Research*, 16.
- Killoran, J. B. (2013). How to use search engine optimization techniques to increase website visibility. *IEEE Transactions on Professional Communication*, 56.
- Kisiołek, A. (2021). Social media in the marketing activity of Polish higher education institutions – the results of the research. *Polish Journal of Management Studies*, 1.
- Krivtsun, A. Lankin, A., Grinchenkov, D., Kushchiiy, D. (2024). Intelligent Management of University International Activities. 1-5.
- Kuzic, J., Giannatos, G., Vignjevic, T. (2010). Web design and company image. *Informing Science and Information Technology*, 7.
- Lažetić, P. (2018). Students and university websites – consumers of corporate brands or novices in the academic community? *Higher Education*, 6.
- Lafuente-Ruiz-de-Sabando, A., Forcada, J., Zorrilla, P. (2019). The university brand image: A conceptual framework from the stakeholder-based perspective. *International Studies of Management & Organization*, 49.
- Leja, K. (2011). Koncepcje zarządzania współczesnym uniwersytetem. *Zarządzanie Publiczne*, 3.
- Łuczaj, K., Kołoda, K., Wiater, W., Wnęk, P., Kusak, K., Pieniążek, M. (2020). Wykorzystanie mediów społecznościowych w komunikacji marketingowej polskich uczelni wyższych. *Zeszyty Prasoznawcze*, 4.
- Mazurek, G., Korzyński, P., Górski, A. (2019). Social media in the marketing of higher education institutions in Poland: preliminary empirical studies. *Entrepreneurial Business and Economics Review*, 1.
- Melekhova, A. (2021). Realizing strategic approach in e-mail marketing. *Vestnik of the Plekhanov Russian University of Economics*, 3.
- Mergel, I., Edelman, N., Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly*, 36.
- Nabout, N. A., Skiera, B., Stepanchuk, T., Gerstmeier, E. (2012). An analysis of the profitability of fee-based search engine marketing. *Journal of Marketing*, 78.
- Okushova, G., Stakhovskaya, Y., Sharaev, P. (2016). Universities' visual image and Internet communication, In: SHS Web Conferences 28:01076, Les Ulis, 28.
- Park, Y., Gretzel, U., Sirakaya-Turk, E. (2007). Measuring website quality for online travel agencies. *Journal of Travel & Tourism Marketing*, 23.
- Patil, S., Shirao, N., Jadhav, D. (2023). A study on impact of digital marketing strategies on education sector. In: *Exploring the art of the digital marketing*, S. Farooqui, V. Pawar, S. Singh (Eds.). Empyrean Publishing House.
- Popa A., Sasu D. (2016). An experiment on using online marketing tools for promoting higher education services, *The Annals of the University of Oradea Economic Sciences*. 2.
- Rayappa, R. (2020). A study on different aspects of digital marketing. *Studies in Indian Place Names*, 40.
- Rozwadowska, B. (2002). *Public relations: Teoria, praktyka, perspektywy*. Studio Emka. Warszawa.
- Saichaie, K., & Morphew, C. C. (2014). What college and university websites reveal about the purposes of higher education. *The Journal of Higher Education*, 4.

- Silva, W. A., Ratten, V., Cassel, G. L., Vendrametto, O., et al. (2025). Barriers to dynamic capabilities in non-leading HEIs in the digital era. *Journal of Management & Organization*, 1–20.
- Stasiak, W., Dzieńkowski, M. (2021). Ocena dostępności wybranych serwisów uczelni wyższych. *Journal Computer Sciences Institute*, 19.
- Štefko, R., Fedorko, R., Bačík, R. (2015). An analysis of perceived topicality of website content influence in terms of reputation management. *Polish Journal of Management Studies*, 1.
- Thomas, J., Chen, C., Iacobucci, D. (2022). E-mail marketing as a tool for strategic persuasion, *Journal of Interactive Marketing*, 3.
- Tiago, M. T. P. M., Veríssimo, J. M. (2014). Digital marketing and social media: Why bother? *Business Horizons*, 57.
- Tiwari, M. (2020). A study on digital marketing and its impact traditional marketing, *Studies in Indian Place Names*, 40.
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122.
- Wiktor, J. W. (2013). *Komunikacja marketingowa: Modele, struktury, formy przekazu*. Wydawnictwo Naukowe PWN. Warszawa.
- Wójcicka, M. (2010). *Uniwersytet. Stabilność i zmiana*. Centrum Badań Polityki Naukowej i Szkolnictwa Wyższego Uniwersytetu Warszawskiego. Warszawa.
- Zhytomyrska, T., Zrybniva, I., Romaniuk, N., Havrysh, I., Gorditsa, T. (2022). Marketing technologies in educational management: current problems. *Eduweb*, 4.