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THE DIGITAL FACE OF MUNICIPALITIES: A NEUROMARKETING STUDY OF WEBSITE ATTRACTIVENESS AND EFFECTIVENESS FOR ECOLOGICAL GENERATION Z USERS

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ABSTRACT

This paper examines the effectiveness and attractiveness of Slovak municipal websites as part of the broader process of digital transformation and innovation in public marketing communication. The aim of the paper is to evaluate the efficiency and emotional appeal of municipal websites from the perspective of Generation Z, an ecologically and digitally oriented user group. The effectiveness of municipal websites was assessed using quantifiable indicators such as clarity, loading speed, accessibility, and informational complexity. The attractiveness of the websites was examined using neuromarketing methods, such as emotional arousal analysis, emotional valence analysis and eye trajectory analysis which reveal users' visual attention and emotional responses. Supplementary structured interviews were also used. The neuroscience component of the research involved 16 participants from Generation Z, aged 19–24 years. The results suggest that local governments are not fully exploiting the potential of digital space and that website design significantly influences emotional engagement and perceived trustworthiness, especially among younger, environmentally conscious users who expect transparent, accessible, and environmentally responsible digital communication. The study contributes to understanding how neuromarketing insights can optimize digital communication strategies within public institutions, making them more attractive, transparent, and aligned with the expectations of new generations of ecological users.

KEYWORDS: digital communication, ecological awareness, generation Z, municipal websites, neuromarketing

1. INTRODUCTION

Generation Z today represents a group that is shaping new standards of digital communication. It is characterized by a high level of digital literacy, constant connection with social media and strong environmental awareness. Members of this generation are actively interested in sustainability, social responsibility and ethical behavior – not only in brands, but also in public institutions. Their consumer and civic behaviour are shaped by the principles of sustainability, openness and trustworthiness. They expect the organizations they come into contact with to act transparently, ecologically and responsibly towards society and the environment. In the context of cities and municipalities, this means that digital communication by local governments is no longer just about providing information, but also about how this information affects the perception of the city or municipality as a modern, environmentally conscious entity. Cities and municipalities today play an increasingly important role not only in managing local development, but also in creating partnerships that support innovation, sustainability and public trust. Public-private cooperation, as their research shows, can significantly increase the effectiveness and credibility of local government initiatives – including those in the field of digital communication. In this sense, local government websites are not only a tool for informing, but also a mirror of the values, approach and identity of the given community. The aim of this study is therefore to examine the effectiveness and attractiveness of the websites of Slovak cities and municipalities from the perspective of environmentally-oriented users of Generation Z – young people who perceive digital communication also through the prism of sustainability, visual cleanliness and ecological values. The study focuses on how the design, content and visual elements of municipal websites influence the emotional reactions, attention level and overall impression of this target group. Based on this objective, two research hypotheses were established:

H1: Some city and municipality websites evoke more positive emotional responses in environmentally-oriented Generation Z users than others.

H2: Generation Z users with a stronger environmental orientation pay attention to different elements of city and municipality websites.

The research is based on the principles of neuromarketing and uses methods such as emotional valence analysis, eye-tracking and qualitative interviews. The aim is to capture both conscious and

unconscious user reactions and understand how environmentally conscious young people perceive digital communication from cities and municipalities – what interests them, what inspires trust in them and what, on the contrary, seems distracting or inauthentic.

2. LITERATURE REVIEW

In the current turbulent times, there is increasing pressure on public administrations, especially on local authorities, the local institutions that are municipalities, to administer most of the public services needed to meet the needs of the citizens living in the territories they administer. Fast and effective communication is essential, and the presence of local governments on the Internet through municipal websites is also crucial. Websites serve as a digital bridge between local governments and citizens, enabling local governments to carry out their tasks and missions efficiently and transparently. A good local government website should not only be functional, but also visually appealing, clear and accessible to all groups of residents [19]. At the same time, it should reflect the values of the community it represents – including attitudes towards sustainability, ecological behaviour and social responsibility. In recent years, the need for “green communication” by local governments has been increasingly emphasized, which is also reflected in their online presentation [5][8].

Generation Z is a group of young people born around 1995, for whom the digital environment is a natural part of life. They are constantly online, accustomed to quick access to information, visual stimuli and interactivity. In addition to a high level of digital literacy, they are also characterized by a strong ecological awareness and interest in social sustainability [6]. Several studies [2][10][12] confirm that Generation Z is increasingly making decisions based on environmental values – preferring products, services and organizations that act in accordance with the principles of sustainability. It is typical for this group that environmental responsibility is not just a trend, but part of their personal identity. They are aware that even small everyday decisions, including the way they use digital tools, can have an impact on the environment. Environmentally-minded Gen Z users therefore expect cities and municipalities to communicate in a spirit of ecological responsibility – not only in terms of content, but also visually. They prefer minimalist design, visual clarity, and an emphasis on transparency and clarity of information [13]. A website that appears chaotic or outdated can arouse

distrust and reduce emotional engagement. Conversely, websites that incorporate elements of visual sustainability – for example, using natural motifs, a green colour spectrum, or communicating the municipality's environmental projects – can evoke positive emotional reactions and a sense of trust in these users [11].

Key Performance Indicators (KPIs) are essential tools for assessing how well a website is performing. These include metrics such as visitor numbers, bounce rates, average time spent on site, and conversion rates. These metrics can show whether a website is engaging, how long it keeps users' attention, and whether it motivates them to act [17] [7]. While the metrics tell us what is happening on the website, they don't tell us why it is happening. It is this missing dimension – understanding users' emotional and cognitive responses – that neuromarketing brings to research. Neuromarketing combines the knowledge of neuroscience, marketing and design and allows you to track how people react to the visual and content elements of a website [14]. While traditional metrics capture the result of behaviour, neuromarketing focuses on the process of perception itself – what intuitively interests a person, what evokes positive emotions in them and what, on the contrary, causes confusion or disinterest. The most used methods include eye-tracking, emotional valence analysis or measuring physiological reactions, which help to determine exactly which elements of the website attract attention and which remain unnoticed [1][4]. Such knowledge is of great importance for website creators – it helps to design interfaces that are natural, understandable and do not require excessive concentration for the user.

If quantitative metrics (such as KPIs) are supplemented with neuromarketing data, a more complete picture of how people perceive the website and what has a positive or disruptive effect on them is created. While numbers tell us what visitors do, neuromarketing can explain why they behave the way they do [15]. Such an approach allows us to create websites that are not only technically functional, but also more human, clearer and emotionally understandable. In the case of city and municipality websites, this has an additional dimension. Ecologically oriented users from Generation Z often perceive the online environment more sensitively and look for traces of values with which they identify – for example, an emphasis on

sustainability, cleanliness, transparency or an ecological message. Understanding these preferences helps local governments create websites that are not only informative, but also valuable – as a trustworthy space representing a modern and environmentally responsible approach.

3. RESEARCH METHODOLOGY

The research was conducted in the first quarter of 2025 and aimed to gain a deeper insight into how environmentally oriented Generation Z users perceive the visual and content elements of the websites of Slovak cities and municipalities. The intention was to verify whether there are differences in the emotional and perceptual reactions of this target group when interacting with different types of self-government web interfaces. The homepage is the first page that a person sees when opening a website and usually contains basic information about the site, navigation elements and perhaps some of the most important content elements. The primary goal of the experiment was to collect information about the emotions and opinions that consumers have when interacting with a given website. For this purpose, two hypotheses were established, which are presented in the introduction to the paper. The sample of respondents was selected intentionally (purposive sampling) to represent the young generation of users with a strong ecological orientation. The inclusion criterion in the research was both the age-demographic characteristics (belonging to generation Z – aged 19 to 24), and the value orientation of the respondents. Before the experiment itself, the participants filled out a short orientation questionnaire, the aim of which was to determine their relationship to sustainability, environmentally responsible behaviour and ecological habits in everyday life. Only those respondents who declared that they were actively interested in ecological topics, preferred sustainable products and services and perceived environmental responsibility as an important part of their own lifestyle were subsequently included in the research. The experiment was conducted in laboratory conditions with controlled temperature, noise and lighting. The subject of testing was the homepages of 5 Slovak municipalities, through the creation of a non-interactive collage of the websites of 5 municipalities, which can be seen in Fig. 1.

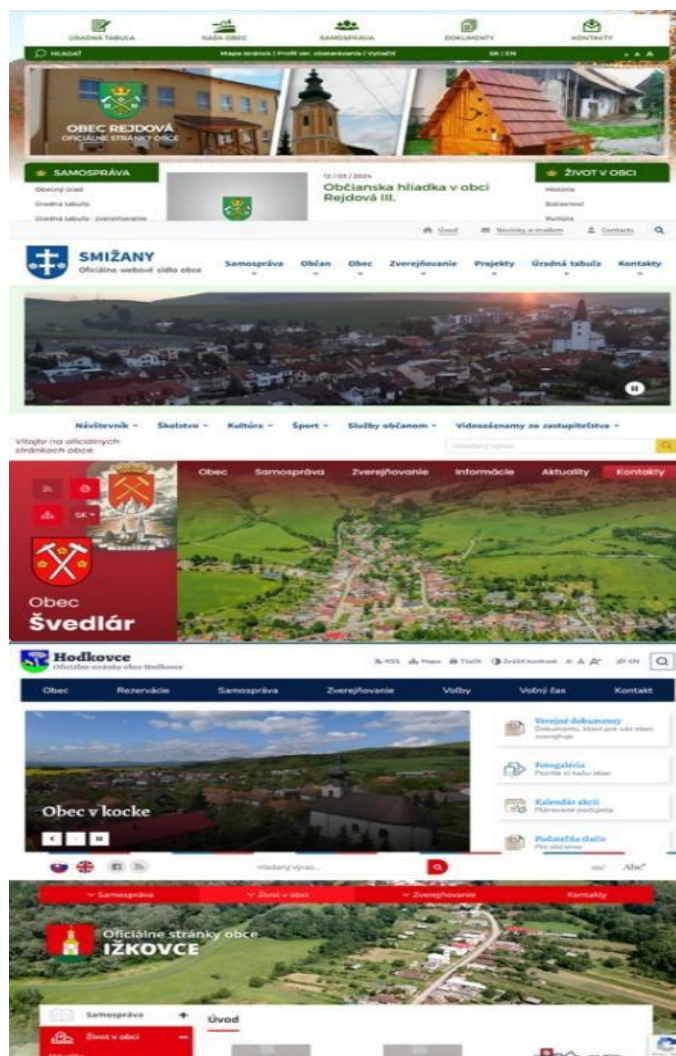


Fig. 1: A collage of the sites of the five municipalities (Source: own elaboration, 2025)

This purposeful sampling allowed the research to focus on a specific group of users who, when evaluating the digital communication of cities and municipalities, look not only at aesthetics and functionality, but also at the extent to which a website communicates environmental values, transparency and social responsibility. Respondents viewed a collage of five Slovak municipal websites, and their reactions were measured using eye-tracking, emotional valence analysis and complementary qualitative interviews. From a methodological point of view, the research combines quantitative neuromarketing data with a qualitative interpretation of the attitudes and values of the environmentally conscious Generation Z. This approach allows for a more comprehensive view of how ecological thinking influences the perception of digital space and how cities and municipalities can use this knowledge when creating their web presentations.

As of 31 December 2022, the Slovak Republic had 5 428 792 inhabitants living in 8 regions, 79 districts and 2 927 municipalities. Of these, 9 426 citizens, living in 7 regions, 30 districts and 70 municipalities, live in the territory where public institutions - municipalities do not manage websites. The Fig. 2 explains in more detail. Given that the territory is heterogeneous in terms of socio-demographic profile of the population, infrastructure, business activity, etc., we determined the average of the total number of inhabitants who do not have access to information from the website, i.e. 1,346.57 inhabitants, and selected the county that is closest to this result. It was the Kosice region. In this region we randomly selected 5 municipalities that have web pages and we carried out further research. The research involved sixteen respondents aged 23 to 25, who belong to Generation Z. The sample was deliberately selected to obtain the opinions and reactions of young people with an ecological orientation – that is, those who have been following

environmental issues for a long time, prefer sustainable products and are sensitive to issues of social responsibility. Such a selection made it possible to capture the specific way in which this group perceives the visual and content elements of city and municipal websites. The sample size was determined regarding time and financial constraints, but with an emphasis on the quality and validity of data

collection. This was based on the observation that even a sample of 15 to 30 participants can generate statistically significant results provided that the consistency and characteristics of the sample are maintained [3]. A bibliometric analysis in this area also points out that the average number of participants in neuromarketing studies is often less than 20 [9].

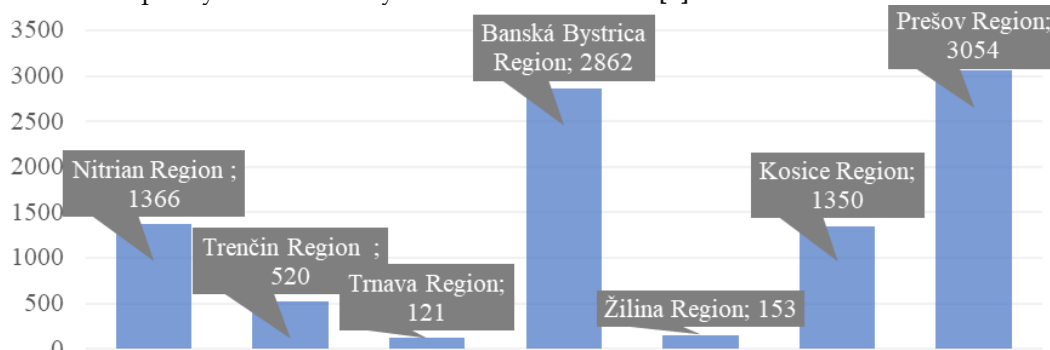


Fig. 2: Number of regionally distributed inhabitants living in municipalities without websites (Source: own elaboration, 2025)

After an initial briefing, respondents were introduced to a presentation of individual pages, which were shown in a random order, which was intended to reduce the effects of first choice preference, better memorization of the beginning and end, or fatigue of the participants during the research. Each page was displayed for one minute, providing enough time for observation and measurement of attention span. The Smart Eye device recorded the respondents' eye movements, while the Shimmer system monitored skin conductance to assess the level of emotional response. A Logitech camera, placed on the monitor, provided video recording of the interaction. Together, these data created a comprehensive picture of Gen Z users' reactions.

To measure implicit reactions, the biometric research platform iMotions (version 10.0) was used, which allows combining several methods - eye-tracking, facial expression analysis and biometric sensors. In this way, it was possible to capture not only the conscious but also the unconscious reactions of the respondents when viewing selected websites. Several types of measurements were carried out as part of the experiment. Emotional valence analysis determined whether the participants reacted positively, neutrally or negatively to the displayed stimulus, based on small facial movements [18]. Furthermore, eye movement analysis was performed, which allowed the creation of heat maps and AOIs - areas of interest, i.e. the places where the participants focused most often. These visualizations revealed which elements of the websites were most eye-

catching and emotionally engaging - such as colour schemes, symbols associated with nature, or the cities' environmental initiatives.

Immediately after the end of the monitoring, an individual interview followed, in which respondents had the opportunity to describe their impressions of each site - how they were affected emotionally and rationally. The goal was to better understand how environmentally minded Gen Z users interpret the visual and content elements of local government websites, and what inspires them with a sense of trust or sympathy.

4. RESEARCH RESULTS

The analysis of the aggregated data suggests that the research participants approached the processing of the displayed collage material quite dynamically. After a short general orientation, they quickly moved on to the analysis of individual elements of the page, which confirms the findings of reference [16] about the tendency of younger users to perceive visual stimuli in short but intense intervals. As shown in Fig. 3, the respondents' attention was first focused on the name of the village or city, regardless of its location on the page. Subsequently, their gaze movement naturally shifted to the right and down, which corresponds to the typical reading pattern in Western culture. This way of processing the visual material indicates that young users - in this case, environmentally oriented members of Generation Z - focus primarily on the basic identification of the place that the website represents.



Fig. 3: Average distribution of research participants' views (Source: own elaboration, 2025)

For members of this group, the name of the municipality has primarily an identification and symbolic meaning, as it represents an entry point into the perception of the digital identity of the local government. Based on this element, the user forms an initial impression of the credibility, modernity and value orientation of the given municipality or city. If the name or main title seems ambiguous or visually distracting, as in the case of a page with the title “Municipality in the cube”, this can cause cognitive dissonance and a feeling of inauthenticity for environmentally oriented users of Generation Z. Generation Z prefers clarity, simplicity and functional minimalism in visual communication, which they understand as a manifestation of transparency and at the same time as an indicator of an environmentally responsible approach. The recorded behavior can therefore be interpreted not only as a manifestation of the visual habits of this generation, but also as a manifestation of the value perception of the content. Environmentally minded users tend to seek order, a readable hierarchy of elements, and visual motifs that confirm that a

website reflects the principles of sustainability and visual cleanliness, thereby increasing its credibility and overall attractiveness. When comparing individual websites, several clear differences emerged, which can best be illustrated through a detailed analysis of the distribution of views and the perceptions of the participants. These differences were identified using the AOI (Area of Interest) methodology, which allows specific areas of the image to be singled out and assigned different values based on the intensity and frequency of viewing, with Table 1 capturing the resulting distribution of views. The results show that all the analyzed pages attracted the attention of the respondents, but the differences were reflected in the way in which the participants returned to them for a long time and how often. According to the Dwells with fixation metric, the respondents spent the most time on website 3, which attracted them not only due to the length of viewing, but also due to the depth of exploration of its individual elements. The Revisit count metric also confirmed a certain primacy of this page – the participants returned to it on average 9.4 times, which

indicates that the page aroused their repeated interest. Conversely, the Dwell time metric showed that the longest total view duration was recorded for

page 1, which may be related to its visual structure or attractive design elements.

Table I: Aoi Metrics

	AOI 1	AOI 2	AOI 3	AOI 4	AOI 5
Respondent ratio (%)	100	100	100	100	100
Dwells with fixations	7	9.2	9.4	6.3	3.7
Revisit count	6	8.2	8.4	5.3	2.7
Dwell time (%)	25.4	15.8	20.2	17.2	12.1

(Source: own elaboration, 2025)

However, eye tracking metrics alone do not provide a complete picture of why participants stayed on some pages longer. A higher number of fixations or returns does not necessarily mean that the pages were automatically more attractive – it could also be a reaction to unclear or visually cluttered content that required more time to decode. Therefore, it was necessary to supplement the analysis with emotional aspects of perception, which help to better understand the true meaning of these findings. To interpret the emotional experience of the participants, the method of emotional maps was used, which allowed to graphically depict areas of web collages that evoked positive reactions on the faces of the respondents. Pages associated with

positive emotions are shown in Fig. 4 by coloring in purple. Based on this analysis, it can be concluded that the emotional experience of the participants differed significantly between the individual websites. More positive reactions were recorded when viewing websites 1, 3 and 4, while pages 2 and 5 evoked more neutral or less favorable responses. An interesting finding was that for pages 1 and 4, a smile or an amusing reaction appeared mainly with random or unexpected elements – for example, with formulations in the menu or unusual titles. On the contrary, for page 3, positive emotions were associated with the logo and the name of the municipality, which the participants perceived as pleasant, clear and visually harmonious.

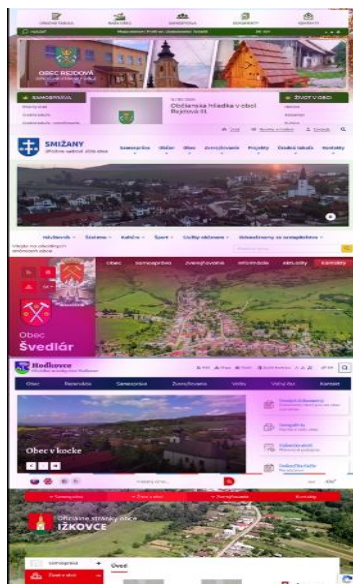


Fig. 4 : Emotional map (Source: own elaboration, 2025)

In the context of environmentally oriented users of Generation Z, these differences point to an important point: positive reactions are not only evoked by the design itself, but especially by a sense of authenticity and aesthetic purity. This group intuitively connects visual simplicity, clarity and natural color with ecological values. Sites that appeared clean, visually balanced, and contained clearly identifiable identity elements (such as a logo with a nature motive or a name that evoked the environment) elicited greater

sympathy and trust from participants. Conversely, sites with excessive color, inconsistent typography, or chaotic layout of elements elicited less emotional response. For this generation, which is accustomed to a minimalist, value-based visual culture, such design appears less authentic and ultimately less ecological – not in terms of content, but in terms of visual pollution.

Important additional insights were provided by personal interviews with research participants,

which allowed for a better understanding of their conscious perception of the websites they viewed. Respondents were asked a simple question – which page had the most positive effect on them and why. Based on their answers, the following ranking was created from the most interesting to the least engaging page:

1. website 3
2. website 2
3. website 5
4. website 4
5. website 1

The results from the interviews partially coincide with the data obtained using the AOI method. According to it, the indicators of the number of fixations and the number of gaze returns had the highest values on pages 3 and 2. At the same time, it was found that positive emotions appeared mainly when viewing page 3, while page 2 attracted attention, but did not provoke significantly positive reactions – which also corresponds to the verbal statements of the participants. Interestingly, the views of pages 2, 3 and 5 had a common element – an aerial photograph of the village, which probably helped the participants to create a more concrete and realistic image of the place. This visual element can be interpreted as a symbol of the connection between man and the environment, which has a special meaning for ecologically oriented users of Generation Z. It is precisely visuals that show the landscape, village or nature “from above” that can evoke a harmonious, complex view of the environment, with which this group of people can identify in terms of values. On the contrary, pages 1 and 4 caused respondents some problems with orientation and understanding the overall context. This is also confirmed by the metrics – the longest viewing time was recorded for page 1, which is probably related to the effort to decipher the confusing layout of the elements. Although the interviews did not directly confirm this fact, the emotional maps suggest that participants responded to these websites with mild humor and distraction, indicating that it was not a positive engagement, but rather a surprise or confusion. In the context of environmentally minded Gen Z users, these results show that it is not only the number of visual stimuli that is important, but especially their clarity and value authenticity. Websites that clearly communicate the identity of a place, are visually clean, use natural motifs or neutral colors, appear more trustworthy and emotionally appealing to this group.

The findings confirm that local governments are not yet fully utilizing the potential of the digital

space. Many of their websites remain more like information portals without a visual or value dimension that would appeal to the younger generation of citizens. However, environmentally-oriented users expect more than just content from modern websites – they expect transparent, aesthetically clean and value-consistent communication that reflects environmental responsibility also in digital form.

5. CONCLUSIONS

This study highlights the importance of the existence and quality of city and municipality websites as an important element of digital communication of public institutions. The research results confirmed that the design and visual processing of websites significantly affect the emotional engagement of users, as well as their perception of the credibility of local governments. In the case of younger, environmentally-oriented members of Generation Z, this influence turned out to be particularly strong – for this group it is important that digital communication is not only informative, but also visually clean, transparent and value-consistent. Neuromarketing methods – emotional valence analysis, eye tracking and emotional map analysis – made it possible to capture how users react to individual elements of websites. It turned out that positive emotions were mainly evoked by those pages that appeared clear, had a uniform visual style and presented the municipality or city in an authentic way. On the contrary, visually chaotic or inconsistent layout of elements caused confusion and reduced the credibility of the website. Interviews with participants revealed that web interfaces that were able to combine aesthetics with functionality were perceived as more modern, more trustworthy, and closer to the values of the ecological Generation Z. These users intuitively associate visual simplicity and clarity with the principles of sustainability – values that they also expect from the institutions they encounter.

Based on these findings, both research hypotheses were confirmed. H1 was supported by the results of the emotional valence and eye-tracking analyses, which showed that certain city and municipality websites evoked clearly stronger positive emotions among environmentally-oriented Generation Z users. Websites with clean design, coherent visual hierarchy and authentic local identity elicited higher emotional engagement compared to visually inconsistent or cluttered pages. H2 was also confirmed – eye-tracking data and heat-map visualizations demonstrated that users with a stronger ecological

orientation focused their attention primarily on elements reflecting environmental or social responsibility, such as imagery of green spaces, local sustainability projects, or transparent contact and community sections. These outcomes show that ecological awareness not only influences the emotional perception of digital content but also directs the way Generation Z users visually explore municipal websites.

The results thus indicate that local governments in Slovakia are not yet fully utilizing the potential of the digital space. The websites of cities and municipalities are often focused mainly on providing information, but they neglect the emotional and value dimension, which is crucial for creating trust and long-term relationships with the younger generation of citizens. If local governments want to appear attractive and trustworthy in the online space, they should approach the creation of websites as part of their communication strategy – not only as a technical tool, but as a value interface between the institution and the citizen. Sustainability and social responsibility should not only be declared goals of public institutions but should also be naturally present in their communication. If cities and municipalities communicate clearly and value-consistently in the digital environment, they

strengthen trust and their reputation as responsible and modern entities.

Although the research was conducted on a smaller sample of respondents, its results provide a valuable basis for further studies aimed at optimizing the digital communication of public institutions using knowledge from neuromarketing. In the future, it would be appropriate to expand the research to quantitatively verify these findings and to compare reactions between different age or value groups. Overall, it can be said that neuromarketing, combined with the principles of sustainability, opens up new possibilities for modern and responsible digital communication of local governments. If cities and municipalities communicate in the online environment as transparently and ecologically as they declare in their strategies, they can become a more trustworthy partner for a new generation of citizens who expect openness, simplicity and meaningful visual messages.

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REFERENCES

- A. H. Alsharif, N. Z. Md Salleh, R. Baharun, and R. H. Alharthi, "Neuromarketing research in the last five years: a bibliometric analysis," *Cogent Bus. Manag.*, vol. 8, no. 1, pp. 1–27, Oct. 2021.
- A. Sagar, A. Jyothi, and P. V. Ranjith, "Gen Z prefers cosmetic brands that are focused on sustainability and environmental issues," *BIO Web Conf.*, vol. 151, Jan. 2025.
- A. Vozzi, V. Ronca, P. Aricò, G. Di Flumeri *et al.*, "The sample size matters: To what extent the participant reduction affects the outcomes of neuroscientific research – a case study in neuromarketing field," *Sensors*, vol. 21, no. 18, Sep. 2021.
- C. -A. Carrillo, H. Bolívar and M. L. Chaves, "Methodology of Neuromarketing in Websites Analysis Approach," *2019 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI)*, Bogota, Colombia, 2019, pp. 1-6.
- E. Čičmancová and J. Soviar, "The Sustainability of Local Governments – Evidence from the Online Environment in the Slovak Republic," *Sustainability*, vol. 16, no. 17, Aug. 2024.
- H. K. Rahmat, N. Syah, E. Barlian, and B. Mamah, "Generation Z and ecological literacy: Building a conscious and sustainable future," *J. Environ. Nanotechnol.*, vol. 14, no. 1, pp. 165–171, Mar. 2025.
- H. Sharma and K. Tripathi, "The importance of website usability in digital marketing – a review," *Int. J. Innov. Res. Comput. Sci. Technol.*, vol. 11, no. 3, pp. 27–31, May 2023.
- I. Sayimer, "Electronic government in public administration: An assessment of local government web sites in Turkey," *Int. J. eBus. eGov. Stud.*, vol. 7, no. 2, pp. 1–16, 2015.
- J. Siddique, A. Shamim, M. Nawaz, and M. F. Abid, "The hope and hype of neuromarketing: a bibliometric analysis," *J. Contemp. Mark. Sci.*, vol. 6, no. 1, pp. 1–21, 2023.
- K. Andruszkiewicz, M. Grzybowska-Brzezińska, M. Grzywińska-Rapca, and P. D. Wiśniewski, "Attitudes and pro-environmental behavior of representatives of Generation Z from the example of Poland and Germany," *Sustainability*, vol. 15, no. 20, Oct. 2023.
- K. Fimberg and S. Sousa, "The impact of website design on users' trust," in *Proc. 11th Nordic Conf. Human-Computer Interact.: Shaping Experiences, Shaping Society (NordCHI '20)*, Tallinn, Estonia, Oct. 2020, pp.

1-5.

- L.-L. Dragolea, G. I. Butnaru, S. Kot, and M. Stefănică, "Determining factors in shaping the sustainable behavior of the Generation Z consumer," *Front. Environ. Sci.*, vol. 11, pp. 1-12, Jan. 2023.
- M. C. Wibowo, "The influence of minimalist design elements on visual preferences of Generation Z: A quantitative study," *Int. J. Graph. Des.*, vol. 2, no. 2, pp. 1-10, 2024. [Online]. Available: <https://journal.stekom.ac.id/index.php/ijgd/article/view/2133>. Accessed: Oct. 22, 2025.
- M. Pluta-Olearnik and P. Szulga, "The importance of emotions in consumer purchase decisions – a neuromarketing approach," *Mark. Sci. Res. Organ.*, vol. 44, no. 2, pp. 87-104, June 2022.
- N. Giannakopoulos, D. Sakas, and S. P. Migkos, "Neuromarketing and big data analysis of banking firms' website interfaces and performance," *Electronics*, vol. 13, no. 16, pp. 1-15, Aug. 2024.
- R. P. Nischal and M. Behrmann, "Developmental emergence of holistic processing in word recognition," *Dev. Sci.*, vol. 26, no. 4, Feb. 2023.
- R. S. Mission, "Website traffic patterns and user behavior: A comprehensive study of visitor interactions and engagement metrics," *J. Innov. Technol. Converg.*, vol. 5, no. 1, pp. 11-20, June 2023.
- T. A. Höfling, A. B. M. Gerdes, U. Föhl, and G. W. Alpers, "Read my face: Automatic facial coding versus psychophysiological indicators of emotional valence and arousal," *Front. Psychol.*, vol. 11, Jun. 2020
- V. Levesque, K. P. Bell, and E. Johnson, "The role of municipal digital services in advancing rural resilience," *Gov. Inf. Q.*, vol. 41, no. 1, pp. 1-10, Mar. 2024.