
Public E-Service on Polish Public Institutions' Profiles in Social Media*

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Magdalena Kotnis¹

Abstract:

Purpose: The article presents the results of research into the level of informational and promotional activity concerning electronic services provided by the largest regional public institutions in Poland on the three largest social networking sites. Worldwide trends in the development of public digital services require targeted and consistent information and promotion activities of public institutions, also with the use of social networking sites. The study covered the largest regional public institutions responsible for creating the capacity and development of sixteen voivodeships (provinces) in Poland.

Design/Methodology/Approach The research methodology includes both quantitative and qualitative methods. The effectiveness of public institutions' activity on social networking sites were examined by means of statistical methods, while the triangulation method was used to analyze the published content.

Findings: The existing literature on the subject has not studied the activity of public institutions in social media with reference to information and promotion activities of public electronic services. In many countries, researchers address challenges faced by the sector of e-services, their implementation level and the sector value.

Practical Implications: Today, high dynamics and costs of implementation of public electronic services make it necessary for public institutions to provide these services actively and effectively. This is due to the specific scope of activity of public institutions and unlimited possibilities of public interaction between the institution and citizens. The rationale for the undertaken research results from the scale of activity of public institutions, which is confined to the list of services, provided to citizens.

Originality/Value: Therefore, a thesis can be raised that generating interactions on social networking sites contributes to the improvement of the public institutions' image and enhances integration of local communities. This is particularly important in the era of building and developing the single market for digital services.

Keywords: Social innovation, local government policy, triangulation method.

JEL codes: O3, O4.

Paper type: Research article.

¹Author, University of Szczecin, Faculty of management. E-mail:
magdalena.kotnis@usz.edu.pl;

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1. Introduction

The entities that make up the public sector are entities, companies and organizations in state, self-government, and mixed ownership. The main task of public entities is to ensure that citizens have universal access to education, social and health care services, etc. These institutions have been established to cater for public needs and to perform the functions (tasks) of the State.

In many post-communist countries, the structure of the public sector has undergone an economic and systemic transformation, which consisted in the transition from a centrally managed to a market economy. The political changes had a direct impact on the process of institutional transformation, which consisted mainly in the establishment of local and regional public entities. The main objective was to improve the state economy and thus the quality of life of citizens by building relations between the citizen and the office and providing public services at the local government level. The transformation processes and the development of public institution structures have not been completed yet. Currently, the directions of changes are determined by citizens' lifestyles and needs. Knight defines institutions as 'sets of social rules according to which social interactions are organized (Knight, 1992).

2. Literature Review

The first decades of the 21st century were marked by the dynamic development of information technology and, consequently, of the e-government (Johnston, 2014) and the market of public digital services (Dawes, 2005; Scholl 2010). A framework document eEurope2005, published in 2002 (eEurope 2005) and the subsequent i2010 - An information society for jobs and growth and A Digital Agenda for Europe initiated activities on the provision of digital services by public institutions. The area and scope of information systems implemented in the public sector have become a priority topic for scientific studies, which underlies the growth dynamics of the digital economy of the public sector (Ancarani, 2005). Many scientific papers propose new concepts of system tools implemented in the fields of e-government services (Jansen, 2010), e-services (Kaisara, 2010), public services (Karlsson, 2010) and digital services (Re, 2010).

The literature also contains deliberations on the rationale for the development of e-government and the implementation of e-services in a multidisciplinary context (Smith, 2019), considering targeted economic development policies pursued by individual governments. The order and level of implementation of digital public services varies from country to country. The information society development strategies developed individually by national governments define the general framework for e-government implementation (Polish Government, European Commission, 2010).

Since 2011, few studies have been conducted on fan pages on social networking sites run by public offices and institutions (Australian Government). The goal set for these institutions is to provide more and more value to the interactions, which allows them to obtain engaged and active recipients. Today, about 2 million companies use Facebook advertisements to promote their products and services (Smith, 2019). Simultaneously, a new style of public management, referred to as New Public Management (NPM), is being implemented (Navarra, 2012). The first projects to use social media to communicate with citizens show that every year the number of taxpayers who have used the e-service websites increases (Knight, 1992). The first attempts to examine the most important challenges that await the public sector when integrating social media with e-services substantiate the arguments for building an information bridge between a citizen and a public office by means of social media sites.

3. Data and Model Specification

When selecting the institutions for the purpose of this study, the priorities of public administration electronic services were considered (Kolenda, 2006). As a part of building a single market for digital services, institutions responsible for public services in each region were chosen. The study covered 66 regional major public institutions in Poland which provide e-services with view to securing broad access to civil rights and obligations. The following public institutions were examined:

- Voivodeship city offices (18 voivodeship cities, incl. two additional cities in Lubuskie and Kujawsko-Pomorskie voivodeships);
- Voivodeship city offices Voivodeship Labour Offices (16);
- Voivodeship Offices (16);
- Marshal's Offices (16).

The e-services provided by the above mentioned offices include: settlement of personal and corporate income tax; VAT declarations and notifications; registration of business activity; public procurement; social benefits; settlement of medical care costs; vehicle registration; obtaining official documents, permits, certificates etc. The scope of activity of the selected institutions covers all residents of 16 voivodeships in Poland.

The analysis of information published in social media by the surveyed institutions requires a specific methodology. The task is to examine the level of information activity (promotion of e-services) performed by the institutions under study on three social media sites: Facebook LinkedIn and Instagram. In the following steps, the dynamics of social media users' response to published posts and the relevance of posted information were examined. To start with, the question was answered how to translate the research problem into the language of operationalised concepts and research questions, and what methods and tools should be used to reach the goal. It

was necessary to establish the borderline between single-method and multi-method research in order to explain what mixed methods meant (Walicka, 2013). In a study involving multiple methods, more than one method is used, and one can distinguish between studies using multiple methods (multiple qualitative or quantitative methods) and studies using mixed methods (a combination of quantitative and qualitative methods) (Walicka, 2015).

The study used statistical methods to illustrate quantitative relationships between interactions on the profiles of selected public institutions. The research focused on data collected from Facebook LinkedIn and Instagram. The data in a numerical form (number of posts, activities, likes, comments, and shares) were analysed and normalised to obtain accurate, comparable, and reliable measurements on large data sets (Nermend, 2009). However, the methods used in quantitative research do not always allow for accurate, reliable, and credible presentation of the problem, and in particular for its in-depth exploration. Therefore, in the study, the interpretation of quantitative data was complemented by a qualitative analysis.

Variables considered in the production of synthetic measures, or used for clustering, are often expressed in different measurement units or cover different ranges of values and are therefore incomparable. In the surveyed set, objects with unusually different values of variables appeared. This is usually a serious problem because when standardised these objects make the remaining values go down within a small range of values.

The obtained data were standardised by adopting the following formula of feature normalisation (Grabiński, 1989; Kolenda, 2006).

$$X'_{ij} = \left\{ \frac{X_{ij} - A_i}{B_i} \right\}$$

where:

- X_{ij} – value of i-th variable for j-th object prior to normalisation,
- X'_{ij} – value of i-th variable for j-th object after normalisation,
- B_i – normalisation base of i-th variable ($B_i \neq 0$),
- A_i – parameters.

In order to find the public institution which published its posts most effectively, the standardised comparison matrix used in the AHP method was applied (Saaty, 1982). The AHP method is used to solve decision-making problems and it belongs to a group of multi-criteria decision support methods. In the study, the criterion adopted to assess the effectiveness of published posts was the level of interactions such as: likes, comments, and shares

$$X'_{ij} = \left\{ \frac{X_{ij}^k}{\sum_{i=1}^n X_{ij}^k} \right\}$$

where:

X_{ij} – value of i -th variable for j -th evaluation criterion prior to normalisation,

X'_{ij} – value of i -th variable for j -th evaluation criterion after normalisation,

$\sum_{i=1}^n X_{ij}^k$ – sum of values of i -th variables for j -th evaluation criterion.

When analysing the quantitative data, basic static measures were used to find out whether the results in a particular group of variables are similar or different and whether there is a relationship between the level of response from users of social networking sites (likes, comments, shares) and the number of published posts. For statistical reasoning on the probability of the results, standard deviation and correlation coefficient were used:

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (X - \mu)^2}{N}}$$

where:

σ – standard deviation

μ – population mean

X – subsequent observation in population

N - number of people in population

$$r(x, y) = \frac{\text{cov}(x, y)}{\sigma_x * \sigma_y}$$

when

$$\text{cov}(x, y) = E(x * y) - (E(x) * E(y))$$

where:

$r(x, y)$ – Pearson R coefficient of correlation between variables x and y

$\text{cov}(x, y)$ – covariance between variables x and y

σ – population standard deviation

E – expected value.

In order to provide a deeper insight into the social phenomenon of acquiring and interacting with the user, the study employed the textual analysis, observation, and interview. Based on the observations and interviews, attention was drawn to the fact that public institutions that run their Facebook, LinkedIn and Instagram profiles report their activities in a similar way. The analysis of published posts covered 198 fan pages. In addition, the study looked at trends and technical capabilities of the

websites under study. On this basis, the most popular topics of posts published by the public institutions were determined. Consequently, six thematic groups were identified:

- posts informing about a citizens' project and competition, participatory budget messages directly addressed to citizens, e.g. informing about a competition opening or invitation to an event, participatory budgets, weather alerts, as well as guidelines on waste segregation in a given municipality;
- posts informing about an municipal or citizens' initiative and ecology issues or changes in public transport - these posts inform citizens about social, municipal and environmental events;
- posts informing about cultural and entertainment events and anniversary celebrations;
- coverage of events attended by public authorities and politicians;
- coverage of events attended by local community members – the presence of local residents is highlighted in the post;
- photos/city panorama/film promoting local attractions – promotion of the city or landmark.

The above-mentioned thematic groups of posts were identified in order to ensure the substantive consistency of the analysis comparing the content of the posts and the number of interactions. The selected extent of information in particular thematic groups of posts was uniform for all the surveyed public institutions. The study examined interactions and acts of communication on three social networking sites in September 2019.

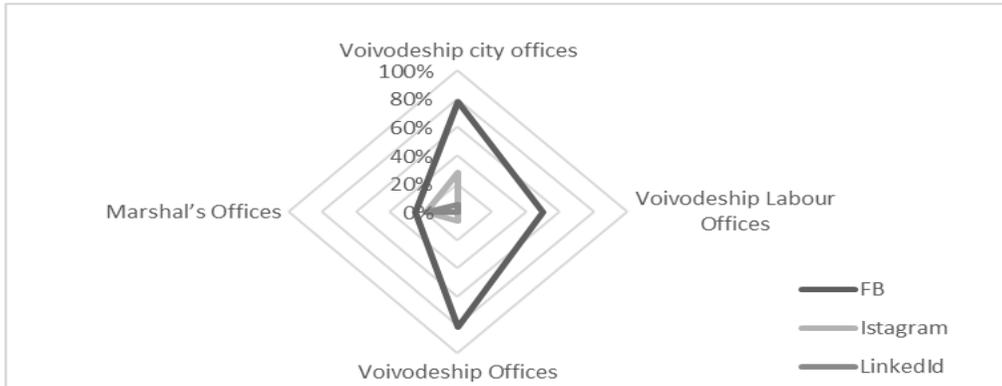
4. Empirical Results

4.1 Activity of Public Institutions on Social Networking Sites

The analysis of the public institutions' fan pages indicates that the most frequently used social network is Facebook. The results of the research indicate that about 60% of public institutions have their profiles on FB, 14% on Instagram and only 6% on LinkedIn. The data indicate that many of the fan pages are registered under names other than the official name of the office. Also, there is no transparency and consistency in the transmission of information. The most active profiles in the social media are those of Voivodship City Offices (about 90% on FB) and Voivodship Offices (about 80% on FB). The Marshal's Offices run the fewest profiles (25% on FB, 19% on Instagram and LinkedIn), even though they implement projects oriented to social and economic development of all regions in Poland. Public institutions, whose task is to encourage citizens' professional activity and provide social services, actively use Facebook, but do not run their profiles on other social networking sites. Over a quarter (26%) of public institutions use at least one social platform to inform

about their offers and activities. Only one out of 66 public institutions under study (the Voivodeship City Office) runs its profiles simultaneously on three platforms.

Figure 1. Profiles of public institutions on social media sites: Facebook, Instagram, and LinkedIn



Source: Author's calculations.

Among the surveyed entities, three groups of public institutions can be distinguished. These are offices, which actively or passively run their social network profiles and those, which do not have their own website. The analysis shows that about 60% of the surveyed institutions have their accounts on Facebook, 25% on Instagram and only 6% on LinkedIn. Less than 90% of them run their profiles actively by publishing several dozen posts per week, depending on the social media platform. As many as 40% of public institutions do not use the opportunity to inform, educate and encourage the community to use digital public services on FB, and about 85% and 95% fail to do so on Instagram and LinkedIn, respectively. Only about 50% of Voivodeship Labour Offices and about 60% of Marshal's Offices have their fan page, and their social activity is marginal.

It is true that public institutions in Poland relatively rarely run profiles on social media sites and the activity on the existing profiles varies greatly, which results in a very high standard deviation for the number of interactions by the institutions under study, taking into account the topics of posts. Relatively few observations/responses are concentrated around the mean of the studied phenomena.

The study analyzed the relationship between the number of posts published by individual public institutions on social networking sites such as FB, Instagram and LinkedIn and the number of responses such as likes, comments and shares. The correlation coefficient showed a strong correlation between the two variables studied in few cases only. The strongest correlation was observed regarding posts on coverage of events involving residents, with local community members being indicated/shown in the post. These results indicate that users of social networking sites watch events held by public institutions and respond strongly to most of the

posts. A similarly strong correlation was noted in the case of posts from the third thematic group, i.e. the posts informing about cultural and entertainment events/anniversary celebrations. A slight correlation was seen in the case of posts showing photographs and panoramas of cities and regions.

Table 1. Coefficient of correlation between the number of posts and the volume of response

	report from event attended by local residents		
	likes	comments	shares
Voivodeship City Office (18)	0.552	0.363	0.363
Voivodeship Labour Office (16)	0.995	0.396	0.984
Voivodeship Office (16)	0.913	-0.076	0.930
Marshal's Office (16)	0.998	0.512	0.982

Source: Author's calculations.

Importantly, both the analysis of deviations as well as the correlation between the number of published posts and the number of responses of social media users was conducted only for Facebook. Few profiles of public institutions on Instagram and LinkedIn and a marginal number of published posts did not allow for a reliable data analysis.

The study attempted to identify those public institutions whose publications evoked the greatest response from the social media community. That meant that, on average, each post should evoke the greatest possible number of responses in the form of likes, comments, and shares. Table 2 shows the standardized data concerning all responses to the posts published by Voivodeship Labour Offices which run their profiles on Facebook.

Table 2. Coefficient of correlation between the number of posts and the volume of response

Voivodship	posts	likes	comments	shares
dolnośląskie	0.100	0.154	0.653	0.106
lubuskie	0.407	0.159	0.000	0.212
opolskie	0.040	0.035	0.041	0.074
podkarpackie	0.073	0.313	0.184	0.226
pomorskie	0.200	0.089	0.041	0.106
świętokrzyskie	0.020	0.021	0.000	0.028
warmińsko-mazurskie	0.033	0.013	0.000	0.009
zachodniopomorskie	0.073	0.168	0.082	0.111
kujawsko-pomorskie	0.053	0.049	0.000	0.129

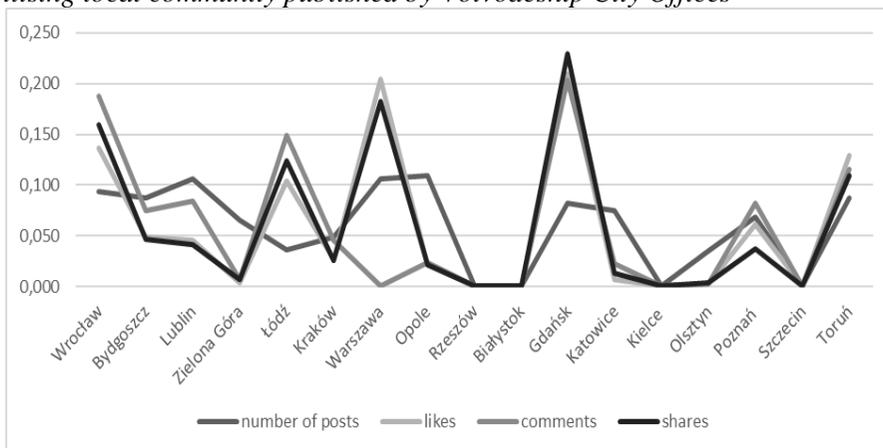
Source: Author's calculations.

The highest effectiveness of all published posts was reached by the Podkarpackie Voivodeship Labour Office. The average volume of likes, comments and shares was

relatively high compared to the number of published posts. The Labour Office in Lubuskie Voivodeship was the least effective, with a relatively large number of posts published, but with a significantly lower level of response.

The results of the research provide important information on the effectiveness of posts in the context of published information. The quantitative data describing the activity of social network site users (likes, comments, and shares) in response to the content published by the public institutions under study were carefully analyzed. The data were standardized with a view to examining the effectiveness of the published posts. The study measured the level of deviation of the number of likes, comments, and shares in relation to the number of posts. As regards the effectiveness of publications about projects, competitions, and digital public services of such public institutions as voivodeship city offices, the results are shown in the figure below. The greater the number of interactions, the wider the range and potentially the greater the effectiveness. The findings of the analysis indicate that the highest effectiveness of published posts informing about new competitions or inviting local community to events was seen in the cities of Łódź, Warsaw and Wrocław. However, although Warsaw boasts a relatively high number of likes, there is a clear deficit of comments, as opposed to other cities.

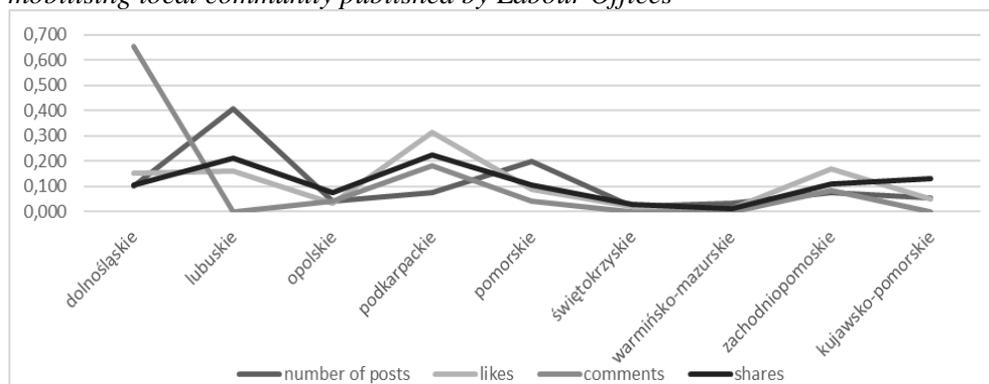
Figure 2. Effectiveness of posts about projects and municipal initiatives. Posts mobilising local community published by Voivodeship City Offices



Source: Author's calculations.

Public institutions, whose main task is to provide social services and support employment, were quite active in publishing posts about projects and services offered. Out of sixteen regions, only nine public institutions informed about their initiatives and services. Public institutions from the Lubuskie and Podkarpackie voivodeships achieved high effectiveness of published information, measured by the number of user responses.

Figure 3. Effectiveness of posts about projects and municipal initiatives. Posts mobilising local community published by Labour Offices



Source: Author's calculations.

The quantitative analysis of public institutions' interactions on the analysed social networking sites indicates relatively high activity and interaction between the office and the local community. It is worth stressing that currently many public institutions still do not run their own fan pages and thus fail to inform the citizens about their projects and increasingly popular e-services. It often happens that the website of a given public institution is maintained under a different name, which can hardly be associated with a site where a citizen can find public services offered by the office. Instead of the official name of a given office, public profiles are named "Mayor of Szczecin" or "The City of Innovation", which is disturbing and confusing. Information about public services is not published at all or difficult to find. There are also fan pages with a similar name, run by other natural or legal persons who in an uncontrolled (subjective) manner create the image of a given public institution.

The results of quantitative research indicate that Facebook was the most popular social networking platform used by public institutions. The qualitative analysis of the published posts was largely limited to information posted on FB profiles.

4.2 E-Services Promoted by Public Institutions in Social Media

The qualitative analysis covered the content published by the public institutions under study. The breakdown of the content into six thematic groups was based on the outcomes of observations and interviews. Generally, the posted content met the promotion objectives set by the public institution itself as well as the promotion of implemented initiatives. This particular group included posts from thematic groups 3, 4, 5 and 6, while posts informing about projects, services, competitions or municipal and social initiatives (thematic groups 1 and 2) were aimed at educating and encouraging the local community to use the services provided. These services were not always provided on-line, however they had a significant impact on the decisions to employ social media tools for image building and transparent relations

and communication with citizens. The results of quantitative research indicate that the social media site most popular among Polish public institutions was Facebook. The qualitative analysis of the posts was largely limited to information posted on FB profiles.

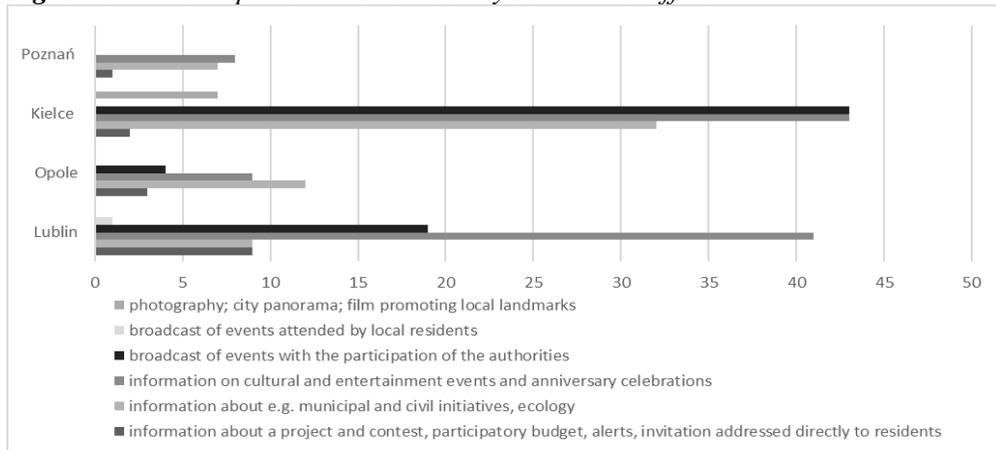
In order to identify the effectiveness of the posts, a deeper comparative analysis was made concerning the six categories of published information. The four groups of public institutions, on the other hand, provide different scopes of services. The group of posts most frequently published by Voivodeship City Offices (document registration services) covered those containing a photograph/ city panorama (thematic group 6) as well as posts informing about a municipal/social initiative/environmental protection issues/ city transport system/education and posts about cultural and entertainment events (thematic groups 2 and 3). Information about projects or services containing invitations addressed directly to local community members was posted slightly less frequently than those indicated above.

The Voivodeship Offices responsible for providing information services and handling international documentation most often reported events with the participation of local authorities. That category of information appeared most often and was promoted by all Voivodeship Offices in Poland. Therefore, the objective was to promote people representing a given public institution. No posting was recorded informing about e-services provided to local citizens.

Marshal's Offices generally provide services targeted at entrepreneurs and are oriented towards the development of entrepreneurship in the region. At the time of study, a relatively small number of Marshal's Offices had their own profile on Facebook (8 profiles/16 public institutions), on Instagram (3 profiles/16 public institutions) and on LinkedIn (3 profiles/16 public institutions). It was also the largest group of regional public institutions with inactive social media accounts. Only four Marshal's Offices published information related to their public activity, but these were just minor attempts to trigger interaction. The bar chart below shows the quantitative data received which confirm poor promotional and informational activities of those institutions.

5. Conclusions

The research results confirm that there is a huge operational gap in the promotion and information space to be filled in by public institutions. The study covered 66 major public institutions in Poland. The aim of the study was information analysis of fun pages run by these public institutions on social networks. The profiles of the surveyed public institutions on three social networks were analysed: Facebook, LinkedIn, and Instagram. The results of the analysis showed an inconsiderable number of profiles of the public institutions studied on social networking sites.

Figure 4. Contents posted on Facebook by Marshal's Offices.

Source: Author's calculations.

Portals such as LinkedIn and Instagram are hardly used by public institutions at all. Most profiles were recorded on Facebook. Unfortunately, an informational analysis of published posts indicates that the published information is insignificant concerning the services offered (including digital services). The most frequently published information concerns the promotion of institutions, public figures, or coverage of events. Only in one case was the promotion of digital services recorded. The surveyed regional public offices use social networking sites to a small extent both to promote and inform the local community about public offers and services.

The effectiveness of published posts is insignificant in most of the institutions surveyed. Although the offices of major cities in Poland (Warsaw, Gdańsk, Łódź) achieve quite a high number of reactions. Although the significance of promotional activities, referred to as digital marketing, is one of the most effective ways to generate targeted traffic to a website on a social networking site, it is not fully used by the largest regional offices in Poland.

It is also essential to acknowledge that the absence on a social networking site does not mean the absence of information published about a given public institution. On the contrary, each user of a social networking site who marks an institution as their location in a post publishes information which in fact is content about the said institution. This confirms the fact that there is no information vacuum in the digital space. Therefore, it is good to consciously and purposefully create the image and projects so that the digital space is filled with valuable and effective information.

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