The Impact of Key Aspects on Admin Panel Design for Online Media Site

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Abstract

This article examines and describes research on determining the priority of influencing factors in designing the administrative part of the site for online media. Since this process cannot be described using mathematical formulas, we decided to use the method of analyzing hierarchies and graph theory in this case. In the course of the conducted survey among managers and editors of online media of the Lviv region, seven main factors were identified and systematized. In their opinion, they have a significant impact on the functionality and quality of the administrative part of online media sites, and the relationship between them was determined. These factors are content management, access control and security, analytics and reporting, search engine optimization, advertising management and monetization, support, and collaboration, and automation of routine tasks. The obtained results showed that one of the most important factors is the issue of security and control of access to the admin. This factor has become the most relevant, especially in modern realities, when a war is being waged in the country and constant hacker attacks are taking place. The next factor, as the research showed, is the convenience of the content management system itself. Since it is the main tool in the work of editors and journalists. In general, we can say that all the factors highlighted in the survey process are closely related, and to create a high-quality solution, a comprehensive approach that considers all aspects of online media management is required. The obtained results of the research will help to better understand this problem and help to find optimal ways to solve it, as well as to improve the user experience and the efficiency of using resources. ways to solve it, as well as to improve the user experience and the efficiency of using resources.

Keywords

site, administrative part, online media, influencing factors, graph theory, the analytical hierarchy process, semantic model

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1. Introduction

In recent years, the number of online media users has rapidly grown. According to a study by the international marketing company We Are Social [1], by 2022, 4.95 billion people use the Internet, and 4.62 billion use social networks.

According to a study [2] by the In Mind company commissioned by Internews, an international organization that implements media programs in Ukraine with the support of the United States Agency for International Development (USAID), from 2022 Ukraine experience significant changes in news consumption. The use of television, radio, newspapers, and news websites is declining, and the news audience is largely shifting to social media. About 74% of respondents said they subscribe to news from social networks, and 42% - from news websites. The most popular social media platform is Telegram, where 60% of respondents read news, 25% on Facebook, and 16% on YouTube. Telegram has shown significant growth in both communication and news consumption. 85% of Ukrainians use the Internet every day. The main device for receiving news is a Smartphone, which is used by 82% of respondents, and among young people aged 18-35, this indicator reaches 92%.

The most popular news sources are the most trusted. About 60% of respondents trust news on social networks, and more than half - online services and national television news.

Consumption of local news has increased in almost all sources, especially news sites. Almost half of the respondents use regional news sites and social networks. However, the success of these resources largely depends on the technical implementation of the site and the quality of its functionality. One of the key elements of any modern web resource is an administrative panel that allows to manage content, users, settings, and other processes. Therefore, the issue of designing and developing control panels for online media is very relevant today.

Unfortunately, web studios and developers often do not pay enough attention to the administrative part of the site and concentrate only on the design and filling of the public part. However, a useful and functional administrative screen greatly facilitates the work of content managers and resource managers, allowing them to quickly update information, manage comments, and collaborate with users. Thus, the creation of a quality administrative panel is the key to the overall success of online media.

2. Literature review and problem statement

As stated above, this topic is quite relevant and, accordingly, is present in discussions and research conducted both in Ukraine and abroad.

Among the studies in this field, we can highlight the following publications. Namely, in the study [3], the authors, recognize that the attractiveness of the site, which in turn increases the interest of potential customers, investigate the innovativeness of sites using HTML code. The authors suggest that the way HTML is used in the creation of a corporate website provides insights into a company's innovative capabilities. The findings indicate that innovative websites differ from non-innovative ones in both size and coding methods. The findings of this study show the features of a corporate website's HTML code reflect the unobservable characteristics related to the skills and creativity of its developers.

An interesting work is the article by the authors [4] in which the value of using websites is considered. The authors conducted interviews with resource-constrained sports clubs from two different sports in two countries. Local sports clubs make a big contribution by encouraging participation in sports. While digital technologies help clubs achieve their goals, many face implementation challenges due to limited resources. This study found that clubs that implemented advanced Internet features (online transactions, including e-commerce and/or automated sports scores), despite limited resources, achieved greater benefits from their websites compared to clubs without these features.

The importance of a high-quality website and its administration is confirmed in the study [5]. The authors of this work conducted a test of correspondents regarding the design and content of the website, namely the use of national elements in the design of the website. As studies have shown, the use of national elements, especially commercial websites, leaves a mixed impression on visitors. Using too much national identity can have a negative effect on future buyers.

The negative attitude of the government of the communist society of Vietnam towards websites, especially those working in the online gaming industry, is shown in [6]. Interviews with administrators working in Vietnam's Ministry of Information and Communications revealed the government's reluctance towards this new socialist-oriented entertainment market. Government guidelines talk about the side effects of using these websites. This study confirms considerable interest and control over the entire market of the web industry.

In confirmation of the previously described statements regarding the state's interest in websites, a similar study was conducted and reflected in the work [7]. This study provides a more balanced understanding of e-government adoption behavior detailed in the drivers of citizen engagement and identifies important practical implications for successful e-government policy. By conducting an online experiment, this study empirically investigated the influence of personal factors, including perceived information literacy and perceived information overload, on users' perceived usefulness and trust in a government website. The results indicated that higher levels of information literacy correlate with greater trust in websites. Furthermore, the study found that information overload is perceived negatively, while concise and timely presentation of informative news is perceived positively.

An interesting study was carried out and described in [8] and was devoted to the study of the relationship between the websites of Australian universities and the recruitment of international students. Primary data collection was done through the content of selected Australian universities' websites. Six Australian universities were selected; three universities with a positive number of foreign students and three universities with a negative number of foreign students. As a result of this study, two conclusions were obtained. First, the websites of universities with positive international student recruitment tend to be more people-oriented, while the websites of universities with negative international student recruitment tend to be technology or system-oriented. Second, websites of universities with positive international student recruitment tend to be more forward-looking or forward-looking, while websites of universities with negative international student recruitment tend to be more backward-looking. In addition, the research findings indicate some important website marketing strategies for Australian universities with negative international student numbers. This study is one of the first to examine university websites using a theoretical framework used in marketing directions, which is a major theoretical contribution. These practical

implications are useful for the administrative bodies of Australian universities to increase the number of international students.

The next work [9], in which it is noted about the presence of the government in social networks and the stimulation of citizens to political life online. This paper reports on the study of the relationship between the quality of information provided by a government institution on social networks and the participation of citizens in political life on the Internet. In addition, the obtained results provide answers to the questions of "why" and "how" regarding the existence of this relationship by examining the mediating effects of transparency, trust, and responsiveness. Data were collected from 388 followers on the social media platforms of a government agency, and the results of the analysis were obtained using structural equation modeling. The results show that an agency's provision of quality information on social media is significantly related to perceived transparency, trust in the agency, perceived responsiveness, and citizens' online political participation. Moreover, the results show that perceived transparency mediates the relationship between an agency's provision of quality information on social media and citizens' trust in the agency. This study aims to raise awareness and contribute to the body of knowledge on government use of social media and its benefits, as there is little research in this area in developing countries. In addition, it provides strategic and practical suggestions to agencies on the benefits of using social media to communicate with citizens.

The importance of presence and concise management of one's affairs in social networks is given in [10]. This study examines whether social media activity and involvement of non-profit organizations affect financial support received from institutional donors and their relationship with the latter. Data are collected through a survey of non-profit grantees who have received at least one Fund of Banking Origin (FBO) grant in the Italian context and are complemented by social media data (i.e. Facebook and Twitter) about the grantees. The results show that grantees with greater social media activity and engagement receive greater amounts of funding from FBOs. In addition, grantees who are more active on social media are less subject to FBO scrutiny. Overall, the findings provide new evidence for the role of online information sources, such as social media, in grant-giver-grantee relationships and contribute to the importance of facilitating digital transformation.

Another engaging work that points to the importance of researching social networks and websites in general is the work [11]. This work is devoted to research and determination of the role of electronic governance in the fight against corruption, which is an active area of research in information systems. Drawing on a value system to assess the impact of e-government and grounding the discussion in three theoretical perspectives, namely: (1) the theory of technological determinism, (2) the theory of general deterrence, and (3) Habermas' view of the public sphere, the authors sought to explore how the diffusion of virtual social networks (VSN) affects the relationship between e-government maturity, public administration efficiency and corruption in a country. This analysis, based on publicly available archival data, confirms (1) an indirect relationship between the development of e-government in a country and corruption in the three branches of government (i.e., legislative, executive, and judicial) through government administrative efficiency, (2) the interaction effect of VSN diffusion on the relationship between a country's e-government development and government administrative effectiveness, and (3) the interaction effect of VSN diffusion on the relationship between a country's governance effectiveness and its corruption

dimensions. The main conclusions of this study can be considered to establish (1) the role of e-government in the fight against corruption in the three branches of government and (2) the perception of the public sphere in the context of the spread of VSN, as well as a further study of its impact on the results of e-government in the country.

Work [12], which reveals and investigates an urgent question of today, namely whether access to social networks can lead to conflict resolution. Social media provides a platform to share content more freely and easily than ever before. Social media helps people to find friends and work, and companies to advertise and establish business connections. However, on the other hand, social media facilitates the sharing of simplistic, false, and provocative messages, and there is increasing anecdotal evidence that online outrage can lead to violence in real life. In this work, the authors investigate whether access to social media is associated with an increased likelihood or intensity of ethnic conflict in the state of Myanmar. It is noted that most people use mobile phones, particularly the Facebook app, to access the Internet. To distinguish the influence of social media from the broader Internet, the authors used geographic differences in mobile coverage as a proxy for Facebook availability. Despite evidence of an adversary campaign using Facebook to reach large audiences, authors do not believe that access to social media is associated with an increased likelihood or intensity of conflict. The only case, according to the authors, that this is possible is only in non-democratic states, authoritarian regimes can use these tools for propaganda and repression, for example, demonstrating the power of social media as an effective tool for detecting protests and monitoring citizens.

Analysis and research show that the audience of online media is rapidly growing, mainly due to social networks and messengers, but classic online media also maintain a fairly high share.

The Ukrainian online media market is going through a very interesting period, keeping pace with global trends. On one hand, the audience for online media is rapidly growing, with more people consuming news on social networks and through messengers on smartphones. This opens up significant opportunities for the development of the industry.

At the same time, traditional media are gradually losing their positions, and this process seems irreversible. Therefore, it is necessary to actively develop new approaches to presenting information and explore for new formats. This is where various technological solutions can be of great assistance.

Many in the industry have high hopes for artificial intelligence. Artificial intelligence has already succeeded in automating routine tasks. It can help speed up news production, make it more accurate and targeted to the audience. However, machines cannot yet completely replace human journalists.

Despite these new challenges, there is much to be optimistic about in the online media industry. The prospects for the development of technological solutions in this field are promising.

3. Basics of the proposed research methodology

As evident from the literature review, researching the operation and debugging of websites, including online media, requires substantial effort. When developing a website, particularly one that is media-oriented, a significant portion of resources is allocated to the public-facing

aspects, such as the design and functionality of the interface. This is understandable, because the front-end is responsible for attracting and interacting with users.

At the same time, the administrative part of the site often remains undeveloped for various reasons. It is not given much attention in terms of design and usability. Often, the administrative part (admin panel) is developed already after the launch of the main site.

This situation creates inconvenience for the editors and administrators of the site. After all, fast and accurate content filling and functional site management depend on the administrative part. Therefore, when developing online media sites, more attention should be paid to the design of a convenient and intuitive administrative part.

In most cases, the content management systems (CMS) already have a built-in administration panel, which is usually quite multifunctional and suitable for solving specific tasks. Therefore, it is more cost-effective to invest time and money once in creating a functional panel rather than continuously spending resources on dealing with an inconvenient one. Quality design is a prerequisite for effective development [13].

This work is quite original because it involves calculations and research calculations and research that do not have mathematical quantities, which in turn prevents the use of known rules and methods. Recent research suggests that for such tasks, the graph method and the Analytical Hierarchy Process can be effectively used. These methods are widely used in such cases and have shown to yield positive results.

The proposed research methodology begins with a survey of respondents to identify the most significant factors influencing their choice of technological processes. With the help of the determined factors, their mutual influence is clarified and a graph of relationships between the factors is built.

A graph is essentially a visual representation of data and their relationships. Its main purpose is to show complex processes and corresponding explanations in written form. Effective use of graphs is ensured by a clear and correct description of graph elements, which include vertices and edges.

After constructing the dependency graph, the next step is to build the dependency matrix [14]. The binary matrix B for the set of vertices H is constructed using the dependence (1):

$$b_{ij} = \begin{cases} 0, if\ i\ does\ not\ depend\ on\ j, \\ 1, if\ i\ depends\ on\ j \end{cases}, \quad (1)$$

where $\boldsymbol{i}$ represents the set of all factors, and $\boldsymbol{j}$ represents the set of graph vertices.

Based on the received dependency matrix and the graph, a reachability matrix is formed according to the following rule (I+B), where I is the identity matrix. The reachability matrix must be raised to the power $\boldsymbol{n}$ such that condition (2) is fulfilled:

$$(I + B)^{n-1} \leq (I + B)^n = (I + B)^{n+1}. \quad (2)$$

The reachability matrix is filled with binary elements using the following relationship (3):

$$d_{ij} = \begin{cases} 1, if\ we\ can\ reach\ the\ vertex\ j\ from\ vertex\ i, \\ 0, in\ other\ case \end{cases}. \quad (3)$$

A path from vertex $\boldsymbol{i}$ to vertex $\boldsymbol{j}$ is considered reachable if it exists in the resulting graph. Such a vertex is called reachable. We will denote such a subset of vertices $\boldsymbol{R}(\mathbf{g_i})$ [15].

If vertex ***i*** is reachable from vertex ***j***, then vertex **i** is called the ancestor of vertex ***j***. A subset of this vertices is denoted by ***B*** (g_i). The intersection of these subsets is represented by subset (4):

$$B(g_1) = R(g_i) \cap B(g_i). \quad (4)$$

From equation (4), the set of vertices for which the condition of unreachability from any of the remaining vertices of the set ***G*** is fulfilled can be defined as a specific level in the priority hierarchy of actions based on factors [16].

A table of factor priorities is constructed for this iteration. The subset $R(g_i)$ contains the elements of the i-th row of the reachability matrix with the value equal to 1. The subset $B(g_i)$ contains the elements of the i-th column of the reachability matrix, which also have the value 1. The subset $R(g_i)$ of $B(g_i)$ is formed as a logical product of elements of subsets $R(g_i)$ and $B(g_i)$. At each subsequent iteration, elements for which equality (4) is satisfied are removed from the table. This operation is performed until only one element remains in the table, which has the highest priority [17].

Thus, according to this research method, after obtaining all levels of priority, a hierarchical model of the priority of factors affecting the technical process under consideration is built.

4. Research results

When developing a website, especially a media-oriented one, a significant part of the resources is allocated to the public part, that is, the design and functionality of the interface. This is apparent because it is the front end that is responsible for attracting and interacting with users.

At the same time, the administrative part of the site often remains undeveloped for various reasons. It is not given much attention in terms of design and usability. Often, the administrative part (admin panel) is developed already after the launch of the main site.

The administrative panel is a part of the web resource, invisible to external users, and intended for site management. It provides the administrator with the ability to create, edit, and delete content, and manage the structure of the resource and other parameters within the functionality of the used content management system.

The main advantage of the admin panel is that it allows you to manage the site without the need for deep technical knowledge. However, even if visitors to an online media site do not have direct access to the admin panel, the design of the admin panel is just as important as the interface design.

Poorly designed or difficult-to-learn administrative screens not only complicate tasks but also increase the risk of errors and require additional resources to correct them. Therefore, the development of a convenient and intuitive administration interface is no less important than the creation of a high-quality front end and affects the productivity of the team working on the site.

4.1. Determination of factors that affect the quality of the administrative part of the online media site

A survey was conducted among managers and editors of online media in the Lviv region in order to identify factors that affect the quality of work with management departments of online media. In total, 20 people from seven online media of the Lviv region took part in the survey.

According to the results of the survey, seven main factors were identified and systematized, which have a significant impact on the functionality and quality of work of the administrative part of media sites, as well as the influence of one factor on another:

1. Content management (g1). It is about the effectiveness of the content management systems (CMS). Ability to add, edit, and delete news and articles. Management of update and deletion of outdated information.
2. Access control and security (g2). Protection against unauthorized access to the administrative panel. Ability to set access levels for administrators. Monitoring and logging of administrator actions. Protection against unauthorized changes to public information.
3. Analytics and reporting (g3). Basic analytical tools for tracking traffic and content popularity. Reports on the work of administrators and their behavior on the site. Monitoring the effectiveness of content placement strategies.
4. Search optimization (g4). Ability to add and edit meta tags and keywords; tools for analyzing and improving SEO indicators. Manage links and URL structure.
5. Advertising management and monetization (g5). Systems for managing advertising content and partner programs. Ability to configure and monitor advertising revenue. Management of the placement of advertising blocks and their effectiveness.
6. Support and collaboration (g6): convenience and availability of support for administrators. Collaboration and data sharing with other administrators. Online resources and documentation for administrators.
7. Automation of routine tasks (g7). Ability to automate processes such as scheduling publications, systems of reminders and notifications for administrators, and integration with other tools and services to optimize work processes.

4.2. Semantic network of influencing factors on the quality of the administrative part of the online media site

Based on the factors obtained in the survey process and given above, an analysis of the semantic network was carried out, which should take into account the key aspects of the administrative part of the news website, which in turn affect its functionality, quality of service, and functioning. This semantic network is shown in Figure 1.

A semantic network is a schematic representation (graph) of relationships between elements that affect a phenomenon or technical process. These elements are interconnected and have a general impact on the overall quality of the administrative part of the online media site. Optimizing them can improve user experience and resource efficiency.

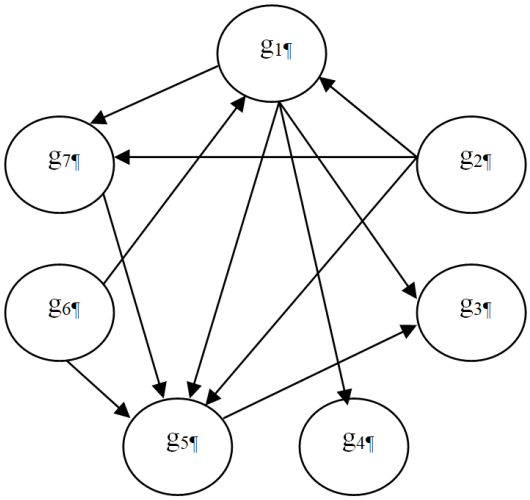

Figure 1: Semantic network of influencing factors of online media administration

The result of processing the semantic network of factors is the following reachability matrix (mathematical analogue of the relationships between factors in the semantic network), which is constructed in the form of Table 1:

Table 1
Reachability Matrix

	g_1	g_2	g_3	g_4	g_5	g_6	g_7
g_1	1	0	1	1	1	0	1
g_2	1	1	0	0	1	0	1
g_3	0	0	1	0	0	0	0
g_4	0	0	0	1	0	0	0
g_5	0	0	1	0	1	0	0
g_6	1	0	0	0	1	1	0
g_7	0	0	0	0	1	0	1

Based on the reachability matrix, let's build tables (Tables 2-5) to determine the ranking levels of the factors obtained.

To determine the importance levels of the factors, we need to build the first iterative table (Table 2). This table is built according to the rule:

- in the second column of the table, enter the subset $\boldsymbol{R}$ (g_i) - these are the numbers of reachable vertices or the numbers of single elements in the corresponding rows of the reachability matrix;
- the third column defines a subset of the predecessor vertices $\boldsymbol{B}$ (g_i) - the numbers of the single elements of the columns of this matrix.

In this context, dependence will signify the fulfilment of the condition of equality (4) of the numbers of factors given in the second and third columns of the table, as a result of which a certain level of factors is formed.

Table 2
Levels of Priority of the Factors of the First Iteration

i	$R(g_i)$	$B(g_i)$	$R(g_i) \cap B(g_i)$
g_1	1,3,4,5,7	1,2,6	1
g_2	1,2,5,7	2	2
g_3	3	1,3,5	3
g_4	4	1,4	4
g_5	3,5	1,2,5,6,7	5
g_6	1,5,6	6	6
g_7	5,7	1,2,7	7

As can be seen in Table 2, the factor with the highest priority of influence on the quality and functionality of the administrative part of the site for online media is factor g_2 "Access control". Another important factor at the highest priority level is factor g_6 "Support and cooperation".

According to the defined levels and according to the approach of mathematical modeling of the hierarchy, rows 2 and 6 are removed from Table 2, and the numbers 2 and 6 in columns $\boldsymbol{R}(g_i)$ and $\boldsymbol{B}(g_i)$ are removed.

The new Table 3 obtained in this way is the basis for determining the next iteration of the calculations of the priority of impact factors.

Table 3
Levels of Priority of Factors of the Second Iteration

i	$R(g_i)$	$B(g_i)$	$R(g_i) \cap B(g_i)$
g_1	1,3,4,5,7	1	1
g_3	3	1,3,5	3
g_4	4	1,4	4
g_5	3,5	1,5,7	5
g_7	5,7	1,7	7

The factor g_1 - content management is at the second level of priority in terms of importance.

Table 4
Levels of Priority of Factors of the Third Iteration

i	$R(g_i)$	$B(g_i)$	$R(g_i) \cap B(g_i)$
g_3	3	3,5	3
g_4	4	4	4
g_5	3,5	5,7	5

g_7	5,7	7	7

Factors g_4 - optimization for search engines and g_7 - automation of routine tasks - on the third level of influence.

Table 5
Levels of Priority of Factors of the Fourth Iteration

i	$R(g_i)$	$B(g_i)$	$R(g_i) \cap B(g_i)$
g_3	3	3,5	3
g_5	3,5	5	5

Accordingly, the g_5 factor is advertising management and monetization at the fourth level of influence. Factor g_3 - analytics and reporting at the fifth level of influence.

4.3. Multilevel model of influencing factors

Based on the results, let's build a structured hierarchical model (Figure 2) of influencing factors on the qualitatively created administrative part of the site for online media.

This structured model of influencing factors is based on a clear list of factors identified during the study. Therefore, changing their number and value leads to a change in the results and, of course, to a change in the appearance of the structured model in the final version.

As a result, the hierarchical model simulates the prioritization of factors that influence the process of creating a high-quality, functional control panel for an online media website. The model obtained in the course of our research includes six hierarchies.

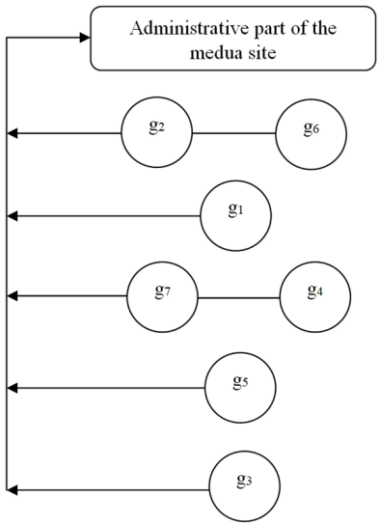

Figure 2: A structured hierarchical model of the priority influence of factors on the administration of the online media site

4.4. Discussion of research results

The study results show that, as expected, security and access control are the most important elements of a quality control panel for online media sites. Equally important are issues of support and cooperation, including the convenience and availability of support for site administrators. And, finally, issues related to content management occupy a rather important third step.

According to the results, the least important factor in the process of creating quality management screens for online media is the issue of reporting and advertising planners. It is important to note that the study of impact factors focused on the quality of functioning of media sites, not on their profitability.

Analysis of factors affecting the quality of control panels of online media sites allows us to assert that compliance with the requirements of higher-level factors can contribute to ensuring the overall quality of the developed resource.

The structured model described above can serve as a basis for further optimization of these factors, taking into account the features of specific software tools and technologies, as well as a basis for choosing a project implementation strategy. Adaptation of the general quality model to the specific needs of the resource can increase the efficiency of its functioning.

5. Conclusion

The results showed that the most important issue is security and access control in the administrative part. This finding is logical, as it helps to protect the site's content and data from unauthorized changes. Additionally, the convenience of the content management system itself plays a crucial role, being the primary tool for editors and journalists.

In general, all these elements are closely related, and creating high-quality solutions requires a comprehensive approach that takes into account all aspects. The model we have built will help to better understand this problem and find the best way to solve it.

It is also worth noting that the list of factors mentioned in this study is not exhaustive and can be significantly adjusted and changed to a more detailed approach or expanded to cover broader categories of impacts.

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