

Analysis and Evaluation of New Digital Media Usage, Impact and Presence

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Abstract – Businesses and institutions often need to monitor digital innovations and stay competitive and up-to-date. New digital media is developing and influencing the environment fast, raising also topics like accessibility, data storage and protection, automatic and artificial intelligence processes. Understanding and using better new digital media and tools for companies and society also includes processes such as management, measuring, evaluating and analysing the effectiveness and usefulness of brand marketing and presence in new digital media. The research shows results of survey among experts for using new digital media in marketing strategies of companies. The paper also presents basic facilitating metrics and measurement tools used in the training process of digital marketing specialists.

Keywords – digital media, metrics, analysis, marketing, instruments, methods, evaluation.

1. Introduction

Definitions and understandings of new media vary widely across sources of information and at different times, as they are constantly changing.

DOI: 10.18421/TEM112-19

<https://doi.org/10.18421/TEM112-19>

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Received: 11 March 2022.

Revised: 18 April 2022.

Accepted: 23 April 2022.

Published: 27 May 2022.

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“New media” is a broad term that appeared in the early 1990s to reflect the changes in the media environment occurring under the influence of computer technology. It includes many different phenomena and practices arising as a result of the dynamic development of these technologies: CDs and DVDs, computer games, the Internet, websites, blogs, social networks, chat, email, mobile phones and applications. Over time, the meaning of this term changes and varies, as well as the technologies themselves. During the years and the development of the Web environment the definition of new digital media changed, going through Web 1 – traditional web environment, Web 2.0 – social web environment oriented to customer, Web 3.0 – Big data connection, usage and analysing of data from various sources with cloud networks, Web 4.0 – intelligent aim orientated software using all technologies, media, collective knowledge, automatic semantic code and decisions. Big data usage means using larger, more complex data sets from various data types and sources that usually need complex and powerful artificial intelligence software that can analyse and use.

The up-to-date definitions of many specialists about modern new media development, Web 4.0 include also “big data” analytics and software, 3D model software and applications, virtual and augmented reality technologies. The new digital media is interactive, multimedia, personalized. It also includes User-generated content (UGC) or activities, the goal-orientated connection of semantic resources, and often artificial intelligence decision models and activities. It includes sites, social networks, mobile and 3D modelling applications, search engine software, analytical software, big databases from various sources and analytical software, cloud networks, open-source databases and collective knowledge libraries, personalized and aim orientated artificial intelligence software and platforms, virtual and augmented reality experiences [1].

Key features of new digital media and digital media presence, for which most sources and experts agree, are new or innovative ways of dissemination, presentation, searching, analysing, and handling digital information and communication. This also includes important matters like the privacy of information, authorship rights, regulating Internet of things, GDPR (General Data Protection Regulation), accessibility for various audiences, portable cloud networks and databases with all devices, online meta-tagging and categorization, FAIR principles for digital data repositories, semantic and visual search software and optimization, cyber security, etc. [2].

Section 2 of this paper presents us how new digital media impacts business and audiences with changing their behaviour, including offering and usage of services, news reports and information. The section also covers the topic of accessibility of sites and generating and measuring online presence in social networks and new digital media platforms.

Section 3 includes results of a research about using new digital media sites and tools for marketing and management purposes, including measurement and evaluation by experts in the business field.

Section 4 summarizes and analyses software tools and methods for management and evaluation of impact and marketing presence in new digital media, including brands, companies, topics and keywords. Authors emphasize on the necessity to follow and analyse this online presence and impact, including assisting automatic processes and methods of value calculation like Response Index (RI).

2. New Digital Media and Its Impact on Business, Audiences and Their Behaviour

Through new digital media such as social networks and open-source platforms, online customers can openly express their views on products and services and customize or add content. They can even adjust the content they see via "smart" platforms, sites, applications, analytical software and RSS feeds and podcasts that remember their preferences. Their behaviour and the way they use them, purchase or evaluate products and services is also changing, as are the business models for attracting and retaining them.

▪ Influence of New Digital Media

The influence and functions of the new digital media can be summarized in several aspects:

1. New personalized or objective-orientated source of information with opportunity for interaction;
2. A new way of consuming traditional media by using all types of media and devices, simultaneously and staying online connected at all times,

3. A new way of communication and interaction between consumers, media creators, businesses, institutions;
4. Catalyst for the formation of social groups, societies, movements or manipulation and mass dissemination or analysis of objective-orientated information;
5. Platform for innovation, that often changes of existing industries, behaviours and processes.

The COVID-19 pandemic and related news also highlighted the influence of digital media on shaping public opinion on various topics. The neglect of strictly scientific information and the bringing to the fore of false sensational news have directly affected the course of vaccination policy in individual countries [3].

We can consider how the news of possible, unproven consequences of one of the vaccines in March 2021 (at that time the only available vaccine in the country) affected the attitudes of the population in Bulgaria towards vaccination.

Figure 1 and Figure 2 show excerpts from the beginning of March 2021 in digital media from Bulgaria, which describe hypothetical negative effects of the vaccine on human health. Similar news could be found in media in other countries at the same time. Figure 3 shows illustrated statistics on the number of daily vaccinations in Bulgaria in the period 01.03.2021 - 01.04.2021. To complement the analysis, similar data are available for Germany and the United Kingdom.

Bulgaria also stops vaccinations with AstraZeneca. What do German experts say?

After Denmark and Norway stopped immunizations with the AstraZeneca vaccine, Bulgaria decided to do so. The EMA sees no reason for such actions. German experts have also criticized the halt to vaccinations.

Figure 1. News about the stoppage of vaccination process in Bulgaria

Death in Plovdiv, they are checking whether there is a connection with vaccination

Figure 2. False news about vaccines in Bulgaria

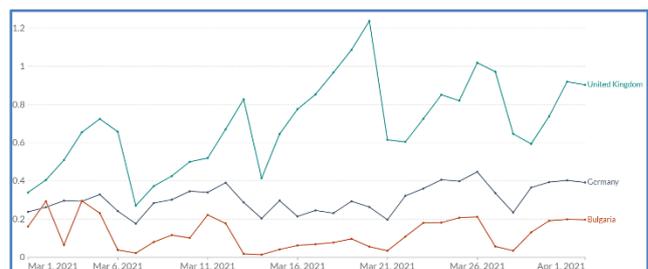


Figure 3. Daily COVID-19 vaccine doses administered per 100 people [4]

There is a direct link between the time of publication and the sharp decline in the daily number of vaccines in Bulgaria. A similar trend is observed in the other two countries considered. The graph shows that it takes more than a month before daily vaccination levels return to pre-fake news levels. In fact, this recovery is due to the emergence of other types of vaccines in Bulgaria. In practice, the vaccine, declared a "dangerous" vaccine, has never regained people's confidence.

▪ **Accessible and Accessibility in New Digital media**

More than one billion people or 13% of the population in the world have various kinds of disabilities. According to the research of the WHO - World Health Organization, the number of persons with a disability grows in time [5]. One of the main aims of EU in the last years has been making valuable content and public services more accessible and with more accessibility for everyone – this includes not just having Internet access and computer to use digital media and content but also having this content in an understandable and perceivable way for people with difficulties in perception and disabilities [6]. Some new media like sites, social networks or software tools and applications are very accessible by the majority of people and some are only accessible to a specific audience and not for others, like virtual reality and 3D, interactive multimedia sites or games, programming software and applications for people with disabilities. Modern technologies give opportunities like voice readers, special keyboard devices for people with disabilities, description and automated search in images and video with keyboards or data libraries, but this technology should be applied more often. Even special software and smart educational games with accessibility have been developed to provide equal access and education for all [7].

There are already existing software tools, which automatically check sites and platforms if they have accessibility. They are not as accurate as a quality test by a real person, but they enable a vast number of sites to be checked automatically in a very short time [8]. The Facebook social media platform also uses automatic software with predefined criteria to check and evaluate content and advertisements and stop those that are not complying with Facebook rules and to legal regulations. Even though some of the automatically stopped inappropriate content might have errors and need of a secondary quality review, still the software tests much bigger content and much faster than real people can. In the modern big data world with immense volumes of generated information and sites such automated software solutions are necessary.

▪ **Innovation and Education with New Digital Media**

Innovation includes the creation and introduction of a new or improved product, service, technology, system, process or method. The tools or manifestations of the new media are constantly evolving and changing. A number of marketing and researches show that companies that succeed to successfully adapt to market innovations and be the first to take advantage of them, have competitive advantage over others; this also applies to digital media and tools. Marketing and Management 4.0 are becoming increasingly popular and closely related to artificial intelligence and objective orientated automated smart solutions working with big amount of data, sites and media channels. Businesses aim to adapt their services to the client faster and better, adding additional opportunities, custom content and online services. This is done with the help of new digital media and new technological, software tools.

Today's marketers, communication experts, software and digital professionals need to keep an eye on these changes and innovations because they also change consumer behaviour and expectations. Years ago, the highlight tendency of new media were real-time messaging and email programs, after the touch-screen digital technologies, the social and cloud networks and so on. In order to be competitive companies, institutions and specialists need to learn fast enough to adapt to the changes caused by the new digital environment and its dynamic development. This also requires adequate methods for training, often via smart games and methods or practical experiences, not just reading written knowledge. It also requires adequate and smart methods of evaluation and automatization of digital efforts and processes, often assisted by suitable software or smart serious games.

3. Research of New Digital Media Knowledge, Usage and Measurement by Experts in the Business Field

Using methods and models previously developed by the authors is conducted a study with combined methods – a study of literature, as well as qualitative interviews and online questionnaires with marketing and digital experts and managers. One of the main conclusions of the study conducted is that a large part of experts in the field do not have enough experience and knowledge of the new digital media, how they can be analysed and used effectively and with less effort and maximum utility. There is a lack of training - internal and external, but the majority of the correspondents have the willingness to learn and develop on the topic if given the opportunity and consider that important for the future competitiveness

of companies and organizations. The research included 15 personal interviews and 107 answers to an online questionnaire by marketing managers, business managers, advertisers, and digital media experts.

Experts, marketers and managers were asked 28 questions regarding new digital media for business use and one of them was: How do you measure and analyse the success of your brand presence in different digital new media? Correspondents could opt out more than 1 answer and results show which answers were opted out by the majority of people.

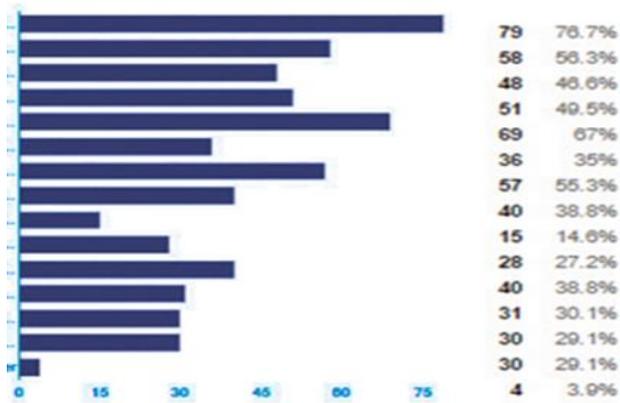


Figure 4. Monitoring and measurement of new digital media usage and presence

They are as follows in the same column order as in Figure 4, from A to N:

- A. Monitor the number and frequency of visits, unique visitors, impressions: - 76.7%;
- B. Search keywords are tracked; -56.5%
- C. The number of clicks, cost per click, the price per person reached from the target group are monitored: -46.6%;
- D. Time of stay and interaction with the brand and actions of active interaction with the brand are monitored: - 49.6%;
- E. Follow the feedback (comments, opinions, user content); -67%;
- F. The scope of the campaigns (number, type, location of irradiated users, etc.) is monitored: - 35%;
- G. Monitor which channels are most effective and efficient in attracting and influencing consumers: -55.3%;
- H. The results in different new media and digital channels during different periods are compared and analysed: - 38.8%;
- I. The overlap of the irradiated audience in different channels and the repeatability of the interaction with the brand in the different channels are analysed: -14.6%;
- J. ROI (Return On Investment); -27.2%
- K. Changes in sales are monitored: - 38.8%

- L. The online presence of the brand is monitored through monitoring tools and software - 30.1%;
- M. Content analysis and users: -29.1%;
- N. Using the help of an advertising, communication or digital agency: - 3.9%.

Given results described above are showing that marketing managers, employees and students in the field of management do not have enough knowledge about new media and working with them, the authors have developed an online training platform "Mindcheck" with tests on the researched topic [16]. The educational platform was tested with students in two different universities.

The authors of this paper also recognize the importance of data collection, machine learning and automatization of the learning and education process to adapt fast and adequate to the fast-developing Internet platforms and changing customer behaviours.

As a part of the possible solutions to the problem described above for learning about new digital media and tools and how to use them better, in the next part of this work various metrics and methods are systematized for monitoring, managing, generating, evaluating and analysing online presence. We present some software applications, sites, and platforms that can assist in managing content and new digital media presence and tools.

4. Methods and Software Tools for Evaluation of Marketing Impact in New Digital Media

Marketing and management goals for analysis often monitor, besides keywords and specific type of content, the advertisement costs, the conversion of traffic into potential customers, the cost of a potential customer, the conversion of potential customers into consumers and accordingly, the cost per consumer.

Measuring the efforts that marketers put into attracting traffic, search engine optimization, blogging, social media and email marketing is an important prerequisite for effective digital marketing and the proper distribution of resources to each of these communication and sales channels. They can be used to draw conclusions in the following categories: traffic, most liked, searched and read content, keywords, time spent on the page, number of pages viewed, dropout rate, loyalty and depth, operating system and browser, geographical features, sources of traffic and keywords, most active inbound and outbound pages, reach, frequency and audience overlap.

Among the most basic and important indicators for measuring the effectiveness of the media channels and advertising campaigns in them are the scope and frequency. Most often this is done through tools that measure the number of ad visits (impressions) and

compare IP visitor addresses so as to differentiate ad visualizations into unique users and previews of duplicate users who have already seen it.

There are also software tools that determine an ad to show only a certain number of times (usually 3 to 5) times per user. This tool is very useful for online advertising formats, which are more non-standard and aggressive in the visualization of content: floating ad ("flying", non-standard advertising banners), wallpaper (home page of a site), expanding (expanding banners, when mouse click on them), branded category ad, etc. Also, a high rendering frequency for them is not necessary and is not even preferable.

The measurement of unique users is measured on the basis of the so-called browser cookies. Most often, ad servers identify the number of unique cookies and measure the number of web browsers used to view an ad. The problem with cookies measurement is that the cookies can be deleted: either automatically by browser or manually by the Internet user. The same problem applies not only to delete cookies, but also up to the average number of web browsers used by one user - which in most cases is more than one. Thus, most advertising servers increase the number of users exposed to the relevant online advertising and reduce the frequency. This means that the real frequency of much of the advertising campaigns is greater than expected when counting all cookies.

- Response Index (RI) - Coefficient / Index of feedback

In analysing the usefulness of various online new media, advertisements and sites is to be included and reported as an impact of the Feedback Index - RI, which varies according to the region, industry and target audience. RI is a variable, coefficient, adjusting the results to the specifics and trends in the respective branch, region or according to the preferences and characteristics of the respective target audience. For example, evaluation of the effectiveness of a digital channel compares CTR - Click Through Rate (i.e. the average ratio of the number of impressions to the number of clicks (Average Click Through Rate), such as the average for the country according to a study by the Gemius agency—gemiusAdMonitor

(<https://admonitor.gemius.com/>) is 0.42% or this is an average of 42 clicks at 1000 impressions (visualizations) of one ad on the screen, while in other countries this one percentage is different, often lower. This coefficient of susceptibility and feedback relative to ads varies by country, by the different target audience, or product industries. Other methods for measuring impact are ROI (Return On Investment), KPI (Key Performance Indicators), Awareness and Engagement Metrics, etc. [9], [10]. In

[11] the authors of the research explain in detail relations and behaviours of audiences online sharing content between followers and different platforms and often overlapping in networks. While overlapping and sharing common values can be beneficial for new interesting information that is seen a few times in different forms and places, it can also have a negative effect and become boring if the content is repeated too many times in the same way.

There are also many assisting analysis of software applications. An example of such software is this of the Gemius Agency, which can correct the expected errors in the reporting of cookies and show the actual scope and frequency of visits, as well as the degree of overlap of the audience - what part of the consumers have seen the ad several times on several different sites. Further step into automatic social media measurement and analysis can be reviewed in a detailed paper of Batrinca B. and Treleaven, P.C with a survey of techniques, tools and social media platforms [12].

- Web Rating of Websites and blogs

A useful tool for measuring the performance of a web page is Alexa for website traffic tracking, tracking of pages related to your website, finding information about the most popular sites and Internet searches to the specific one moment. According to data from this tool, some of the most popular websites in the world scale are Facebook, Youtube, and Twitter and therefore every company should have presentation in them. Google Toolbar provides information about Page Rank on a page, as well as competitors. Another useful tool is Website Grader, which gives a complete picture of the number of links, how many pages are indexed in Google and tips how to improve results. Google Analytics is a widely used tool, which offers detailed information about what is happening on a website in a total of three directions - user behaviour (visitors, unique visitors, number of openings per page, dropout rate, average time spent on the website), consumption of website content (most liked and most viewed content), sources of traffic and page references. The software products of Gemius Bulgaria also track in detail the actions of visitors on a specific website at a certain period of time. Last but not least is the Google Keyword Tool, which allows us to learn about user behaviour online in general, and Google Trends presents seasonal changes in Google search. Other marketing opportunities oriented software: Kissmetrics (<https://kissmetrics.io/>) – relates actions on site with customers and their characteristics and behaviour and VWO (<https://vwo.com/>) – site A/B experimenting and testing tool. Useful and free tools for statistics and analysis of results in blogs and newsletters are FeedBurner (a web feed management service primarily for monetizing RSS feeds, primarily

by inserting targeted advertisements into them) and Google Analytics (site analytics software online, suitable for WordPress), Bees, Enquisite, StatCounter, Blog Tracker, Site Meter, Performan Metrics et al. For blogs, it is useful to calculate using WordPress the dialog index, which represents the ratio between the number of comments to posts and the number of posts themselves.

- Social and new digital media management software and presence analysis

Maintaining a quality presence on many social and new digital media can be a challenge for any marketer or manager and it requires a lot of effort, work and time. That is why there are already many platforms and software through which presence in more than one social media can be managed, measured and compared as results [13], [14]. Content can be also easier to regularly renew, maintain and post. Examples of such platforms and their most useful features are Hootsuite (post-management on all social media), Buffer and Social Pilot (posting, engagement, analysis for audience reach and reaction on 5 popular social media platforms with Buffer and 8 platforms with Social Pilot), Followerwonk (Twitter Analytics following, analysing following audience), Sprout Social (helps with Review Management, Mobile App, Competitor analysis, CRM, Engagement, Social Content Calendar, Custom Workflows, Trend Analysis. ViralWoot (management on social platforms focusing on photos and videos) and Tailwind (management of Pinterest and Instagram publications, promotions and growth), Iconosquare (posting and analytics for Instagram, LinkedIn, Facebook, Twitter, TikTok), Social Bro (Twitter social network - demographics, best time for activities, reports), SumAll (gathers, analyses and visualizes with graphics data of social impact and posts) and Cyfe (Cyfe provides a browser-based dashboard that allows business users to connect to many data services, automate data retrieval, analyse, and then transform and visualize the data for business intelligence), Beevolve (monitoring brand, keyword presence across social networks, with measurements and analysing conversions and return on investment of social media content). Other possibilities are IFTTT (web-based application management service connecting many apps and devices and services from different developers with automated processes, <https://ifttt.com/>). There are also several social media presence management platforms enabling automated, easy and fast social media content generation and scheduling –

SocialOomph (<https://www.socialoomph.com/>),
Social Flow (www.socialflow.com),

Socialbakers (www.socialbakers.com),
Oktopost (www.oktopost.com)
for B2B companies whose customers are other companies), most of which offer one-month free period, which allows to test their functions and choose the most suitable for the given company.

- Analysis of search engine optimization for the company and the competition

It is useful to analyse not just the performance of your own company in search engines, but also its comparison with competitors. A research of how SEO – Search Engine Optimisation can impact business and how it can be used as digital new media marketing tool for brands and companies shows why online digital media presence, management and evaluation should also include software applications and platforms measuring SEO and SEM (Search Engine Marketing) [15].

Useful tools for analysing search engine optimization machines on websites are SEORCH (www.seorch.eu), Web SEO Analytics (www.webseoanalytics.com/) and Woorank (<https://www.woorank.com>), the first of which analyses all important elements, detects errors and offers opportunities for improvements optimization. Spyfu (www.spyfu.com/) is a useful tool, the free version of which allows you to compare both your website and that of organic and paid keywords of competitors. With iSpionage (<https://www.ispionage.com>) you can compare with competitor's SEO strategies, traffic, conversions and keywords.

5. Conclusion

The paper describes new digital media, tools and instruments, their development and their importance and impact on businesses, consumers, institutions, audiences and even public topics and tendencies. Research results are showing how crucial and impactful new digital media presence is as well as how experts use and measure it. The paper also offers synthesized material, metrics, methods and helpful software tools for marketers and managers to manage and analyse online presence. This can be useful for companies, institutions, experts, educators in the field and all those who want to develop their presence online and reach people more efficiently and accessibly with the help of new digital media. Lack of sufficient knowledge and training on the topic is an important issue identified in the study and possible solutions are offered including relevant monitoring and analysis software applications and platforms, and an online training and testing system developed by the authors – Mindcheck.

Acknowledgements

This research was funded by the National Science Fund of Bulgaria (scientific project "Digital Accessibility for People with Special Needs: Methodology, Conceptual Models and Innovative EcoSystems"), Grant Number KP-06-N42/4, 08.12.2020.

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