ЖАҢА МЕДИА / NEW MEDIA / НОВЫЕ МЕДИА

Working principles of data journalism

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Abstract. This article examines the development of data journalism in Kazakhstan and its practical applications. Data journalism enhances information processing by collecting, analyzing, and visualizing data. Modern tools like Python, Excel, and Tableau simplify journalists' tasks and improve the accuracy of the presented information. Although data availability is growing in Kazakhstan, data journalism faces challenges due to limited sources or inconvenient formats. Internationally, open data portals significantly improve access to information. In Kazakhstan, the number of open data sources is increasing, providing journalists with better access to information, but the field remains in a developmental stage. Data journalism effectively conveys information not only through text but also visually, using infographics and charts for easier comprehension. The study highlights that data journalism in Kazakhstan is an emerging discipline shaped by globalization and new technologies. Its importance in the information age and its potential for further growth are becoming increasingly evident.

Key words: data journalism, open data, data analysis, data visualization, interactive graphics.

Introduction

To work in the field of data journalism, media professionals need to be proficient with various analytical and technical tools, ranging from basic programs like Excel and Google Docs to more advanced tools such as IBM ManyEyes, Wordle, Planning Tools, and OfficeReports. In Kazakhstan, journalists currently have limited skills with these tools. Data journalism often requires knowledge beyond traditional journalism, including understanding how state advertising services operate, interpreting laws, decrees, and regulations. If a journalist is

not familiar with the principles of institutional operations within their country, their career in journalism may quickly falter. Proficiency in English is also crucial, as most information is available only in English. The gap between journalists who can utilize all resources of data journalism due to their language skills and those who cannot is substantial. Mastery of online search skills is essential; using basic Google searches is insufficient. Advanced searches by format, topic, and date are necessary. Additionally, journalists must be aware of which official websites hold data, as many governments are slow to release information. Journalists need to know how to manage numbers in programs like Excel: understanding mathematics, descriptive statistics, and inferential statistics is vital. Journalists with a fear of numbers will likely struggle with analyzing topics like state budgets, taxes, crime, or pollution. Learning data journalism skills is mostly a self-taught endeavor, as few journalism schools teach data journalism except in rare cases, making practical learning urgently needed.

Research Methods

Data journalism has become a contemporary and trendy term describing modern journalism practices. As Young, Hermida, and Fulda point out, "Data journalism is a set of charts, tables, photos, and videos used by journalists" [1]. It is important to note that editors of global and Kazakhstani newspapers actively use infographics. To present complex calculations, they include diagrams, tables, and images in their publications. Borges-Rey notes that "Knowledge of data searching, cleaning, and visualization helps in information gathering, and data journalism helps in narrating complex events through infographics. Journalists proficient in these and more advanced methods find it much easier to write articles" [2]. Pilgun emphasizes that "Journalists now focus less on finding quotations and more on establishing strong positions backed by data. This shift has significantly impacted the role of modern journalism"[3]. It is crucial to highlight that journalists do not regard digital data merely as numbers in spreadsheets but as substantive information. As Ausserhofer et al. observe, "Before the advent of the internet, when information was scarce, much of the effort of Kazakhstani journalists was spent on searching and gathering. Now that information is abundant, processing has become the priority" [4].

Today, all major publications in Kazakhstan are striving to adopt this approach in journalism. Among the most widely read newspapers and magazines in Kazakhstan are "Egemen Kazakhstan," "Kazakhstanskaya Pravda," "Zhas Alash," "Ana Tili," "Zhetysu," "Ogni Alatau," and others. Although data journalism is a new trend in Kazakhstan media, it is developing in national newspapers like "Egemen Kazakhstan," "Kazakhstanskaya Pravda," "Vremya," and "Karavan," as well as several Kazakhstani online publications, including www.bnews.kz, www.tengrinews.kz, and www.nur.kz. A review of materials from 2020 shows an increased frequency of infographics usage by these newspapers and online portals. Additionally, Kazakhstan media are currently inclined to publish brief articles with the latest figures from official national statistics. "It should be noted that the absence of infographic support in short stories on websites negatively impacts their value," as Boyles and Meyer observe [5]. Dick adds that "Infographics affect the quality of the material presented and lead to a decline in positive reader evaluations of the publication" [6]. We believe that a more selective approach

to article coverage and its informational content can address many issues. The principle of using infographics is to complement textual material (articles).

Infographics have significant potential for newspapers like "Kazakhstanskaya Pravda," but their usage remains limited due to several factors. For instance, some news stories are more suited for interactive visualizations than others. Simply having "big data" does not automatically lead to the creation of effective infographics. Certain types of numerical data are more conducive to creating visual content than others. A key feature of data journalism is discovering the often invisible connections between news and numbers [7]. For example, in Kazakhstan's current economy, there are unseen links between products, people, and technologies. Data journalism helps uncover these connections. As Chernyetsky notes, "Online data may seem insignificant, but with the right perspective, they reveal crucial insights. Thus, collecting, filtering, and visualizing what happens around us is increasingly important" [8].

The growing array of information delivery methods reflects the expanding possibilities for data presentation. Leading TV channels in Kazakhstan, such as "Qazaqstan" TV's "Aqparat," "Eurasia" TV's "Main News," and "31" TV's "Informburo," excel at using data visualization. Over the past decade, attitudes towards infographics have evolved, enhancing the way events are conveyed [9]. Access to statistical data, from sites like stat.kz and finprom.kz, has made it easier to analyze, interpret, and explain information. As new tools emerge, journalists increasingly use them to explore data. Social media users are continually collecting data through platforms like Facebook, Twitter, and VKontakte.

Journalists must handle numerous forms, texts, and graphics, keeping in mind three main components: presenting essential documents, explaining data collection methods, and adequately describing the data. The primary focus of data journalism shifts from merely reporting to interpreting what data reveals about specific events. Data should be viewed through various perspectives, opportunities, and possibilities. For instance, data can illustrate how abstract threats like unemployment impact different demographics. It can also analyze complex situations like uprisings or political debates, revealing potential solutions to intricate problems. Familiarity with data processes, such as searching, cleaning, and visualization, transforms the profession. Skilled journalists leverage their expertise to create insightful articles, bringing clarity, variety, and ease to their work.

Data is invaluable, providing insights into processes and solutions. Journalists often publish bold materials supported by precise figures. However, infographics can be risky if they merely decorate rather than enhance understanding. Poorly designed infographics may distort information. Despite cultural differences, Kazakhstani journalism is successfully adapting to global data journalism trends. Notably, there is a shift towards open metadata journalism, driven by open government initiatives worldwide, including in Kazakhstan. This development enhances the role of metadata in journalism and suggests new formats for media information consumption, deepening audience engagement and aligning with innovative discourse paradigms.

Mastering data manipulation is a valuable skill. Proficiency in data tools reduces redundant work and saves time, facilitating access to accurate facts. While journalism's core principles of accuracy and clarity remain unchanged, the forms of media consumption have evolved. The

essence of journalism – presenting information transparently – continues to be crucial, with new media requiring innovative formats. Multimedia tools help quickly and effectively interpret data content, enhancing understanding and engagement.

Multimedia extends beyond text to enhance audience engagement with content through video, audio, photos, and other technological methods. For instance, videos can evoke additional emotions from viewers, while infographics provide quick access to essential information. Audience participation involves encouraging actions such as commenting, sharing, or contributing to the development of content.

In practical data journalism, creating effective infographics requires not only finding relevant data but also verifying its accuracy. The following brief article provides an example of verifying economic data from the Prime Minister's statements.

The Guardian newspaper launched a project in 2009–2010 to investigate the expenses of Members of the UK Parliament. They published 460,000 pages of expense reports and asked readers to help identify questionable expenditures. As a result, several MPs were compelled to review their expenses and repay certain amounts. This project became recognized as a prime example of data journalism because it made open data accessible to the public and enabled readers to participate in the process of analyzing data and reporting.

According to Mark Coddington, a common practice in data journalism is to openly provide datasets to the audience or create tools for exploring them [10]. Sometimes, the audience is tasked with processing and analyzing the data themselves (crowdsourcing). For instance, by allowing people to verify the data, journalists aim to involve the public in the process rather than controlling it entirely themselves.

Editorial choices remain crucial in data journalism. Journalists analyze and present the data in an understandable way, but the audience's role in this process is also expanding. Thus, data journalism becomes a collaboration between professional and citizen journalism.

When developing data journalism products, such as data visualizations or web applications, the primary focus is on ensuring their usefulness to the audience [11]. In data journalism, society plays a direct role, as the goal of this process is to provide the public with accessible tools for understanding and independently evaluating social issues. However, as researchers Fink and Anderson note, although many data journalists claim to serve an active public, their understanding of the audience is often generalized and measured anonymously through online metrics [12]. This means that, in the journalism process, the audience is rarely considered as individuals or as interactive participants.

According to the study by Boyles and Meyer, data journalism offers several advantages over traditional journalism. By integrating big data, digital technologies, visualization, and computational methods, it can achieve greater depth, objectivity, and accuracy. Moreover, it broadens opportunities for audience interaction, enabling active participation in the creation, dissemination, and consumption of news [13]. Data journalism strives to establish a deeper connection between media and readers by actively engaging the audience. However, involving the audience in the content creation process may sometimes pose a risk to the professional reputation of journalism. Researchers Anderson and Borges-Rey argue that this is because increased audience influence can weaken journalists' control over their work [14].

Table 1. Despite this, the approach offers several significant benefits:

Benefit	Description
Increased sources	Audience engagement makes it easier for journalists to access new and important information.
Enhanced transparency	Audience participation helps journalists present their work in an open and comprehensible manner, thereby strengthening trust.
Credibility and fairness	Close collaboration with the audience ensures that socially significant issues are addressed honestly and equitably.
Reputation restoration	These advantages allow journalism to not only maintain its standing in the digital era but also strengthen it.

Discussion

The abundance of open data online facilitates the creation of data projects. In Kazakhstan, open data can be accessed through the [Open Data Portal] (https://data.egov.kz/). Journalists often have Excel spreadsheets from press releases or emails, but might neglect further use of the data due to insufficient data handling skills.

Key Data Skills:
– Finding data
– Acquiring data
– Cleaning data
– Analyzing data
– Translating data into simple language

Once data is found, it's crucial to determine its type and the insights it offers. This stage, known as hypothesis formulation in data projects, involves understanding what the data suggests or raises questions about.

Creating a data story involves understanding what the audience wants to do next. Data can be used to:

1. Draw public attention and engage them in the story.
2. Demand more information from authorities, even if the data is not perfect.
3. Remember that the core of the story is the event itself, which ultimately involves people.
4. Use expert opinions to address unanswered questions.
5. Analyze the significance of issues, with experts providing detailed explanations.
6. Approach interviews as an expert, having in-depth knowledge of the topic.
7. Engage with interviewees as if you already know the subject deeply, enhancing the depth of questioning.

The Guardian's data team pioneered early data stories (https://www.theguardian.com/data), and their projects are worth following. Many economic issues are similar across countries, so reviewing their data and adapting it with your own can be insightful. For example, India's [IndiaSpend](https://www.indiaspend.com) tracks government spending and could serve as a model.

It's crucial to remember that the essence of data work is the event itself. To ensure a well-rounded project, answer the following questions:

1. Problem Question: How significant is the problem? How costly? Is it improving or worsening?

2. Impact Question: Who is affected by the problem? How? Are some groups more affected than others?

3. Cause Question: What is driving the problem? Which factors exacerbate it?

4. Solution Question: What are potential solutions? How effective are they?

Data visualization is designed to deeply understand and interpret data, whereas infographics aim to tell a specific story. Although both can be visually appealing, they serve different functional purposes. Simply creating attractive graphics is not enough; the audience must be able to understand and use the information effectively [15].

Many online tools assist with data visualization, such as Tableau (https://public.tableau.com), which helps with visualizing, cleaning, and sorting data. Another useful tool is Flourish, developed by Google, accessible at flourish.studio with a Gmail account, offering around 90 types of graphics. The key is to organize and format your data appropriately.

Launching a data project begins with finding relevant data and ensuring its high value to the audience. Sometimes, the data itself can spark a compelling story.

Example: Economic Indicators from Kazakhstan's Statistics Committee

Consider exploring economic indicators on the [Stat.gov.kz] (https://stat.gov.kz) website. To do this, open the site and review the database that interests you. For instance, data on the "Information Kazakhstan – 2020" program might be particularly engaging, as it reveals outcomes or financial expenditures.

1. Downloading the Data: Navigate to the relevant dataset and download it by double-clicking the program's name, which will save an Excel file. Open the file to find various categories and numbers. This data consists of 34 rows and 12 columns.

2. Data Cleaning: Identify and isolate the data you need. For example, find the row listing "Number of Domestic Feature Films in Theaters" over five years. Use Excel to filter and retain only the necessary information.

3. Creating the Visualization:

– Copy the cleaned data to a new Excel sheet.

– Use Flourish (www.flourish.studio) to create a line chart. This is suitable for showing trends over time.

– Select the Line Chart option and input your cleaned data into the tool. Remove unnecessary columns (e.g., C, D, E) and copy your data into the appropriate fields.

– Preview the chart. If errors are detected (e.g., incorrect numbers due to formatting issues), correct these by standardizing separators (e.g., changing dots to commas or vice versa).

4. «Publishing and Interpretation»: Once the visualization accurately reflects the data, you can publish it on a website, social media, or in print. For instance, an inquiry like, "Why did the number of domestic films in theaters drop in 2017?" could form the basis of an engaging data story.

Key Considerations for Effective Data Visualization:

– Accountability: Identify who is responsible for the data before visualizing it.

– Clarification: Seek explanations for any ambiguous terms or metadata from the responsible organization or person.

– Expert Consultation: Consult experts if there are doubts or difficulties understanding the numbers.

– Trend Analysis: Use trend lines for data that spans time periods.

– Bar Graphs: Use bar graphs for data showing ranges or quantities.

– Geographical Data: Utilize maps for geographic data.

– Visual Comparisons: Use visuals to compare differences, such as old vs. new.

– Source Attribution: Always cite the source of your data.

Infographics are a crucial tool in data journalism. Gaining proficiency in creating them is beneficial. For instance, the "SAQ" national analytical magazine demonstrated early use of infographics in its November 2019 issue. The magazine, transitioning to a digital format, featured infographics in its coverage of the December 1986 events. Infographics presented detailed data from the commission led by Mukhtar Shakhanov in a simplified and engaging manner (Abdikhalyk O., 2019).

By incorporating these practices, you can effectively create and publish infographics that enhance understanding and engagement with data[16].
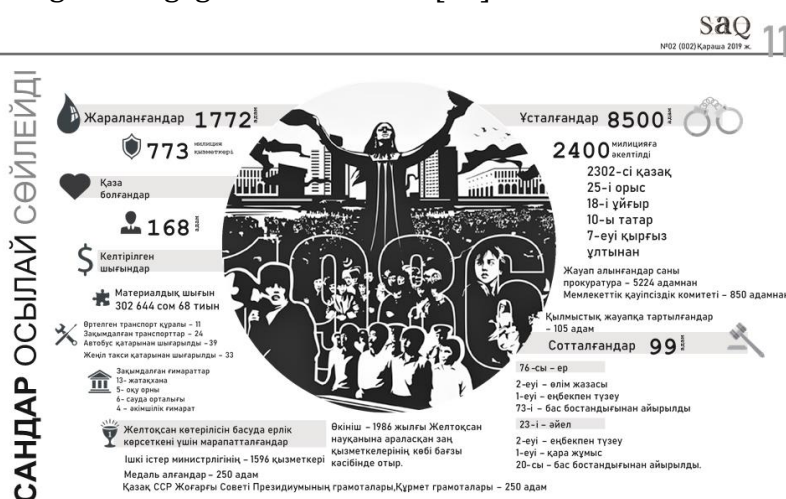

Figure 1. "Numbers Speak"

Source: SAQ Magazine

Data journalism is rapidly advancing in Western countries and the US, with specialized conferences, dedicated editorial teams, and columnists focusing on data-driven content. However, Kazakhstan's progress in open data transparency lags behind globally, as evidenced by its ranking of 59th in the Open Data Barometer (opendatabarometer.org, 2019). This ranking reflects factors such as data openness, update frequency, ease of access, and the comprehensiveness of data across various sectors.

In Kazakhstan, open data access remains limited. The Open Data Barometer indicates that critical data such as government spending, land ownership, public transport schedules, election results, and budgetary information are often incomplete or inaccessible. Despite the presence

of the [data.egov.kz] (https://data.egov.kz) portal, which was accessed by 846,000 users from 2015 to 2019, many of these users are likely government employees managing data uploads. For instance, medical data is only available for ten regions, leaving gaps in national coverage. Additionally, information about pharmacies is also lacking.

Under Kazakhstan's "Mass Media Law," requests for information should be answered within seven working days unless otherwise specified. If multiple information holders are involved, the response time can be extended up to fifteen working days, as per amendments made in 2019. This extension from the previous three-day response time represents a significant challenge for data journalists and media outlets.

Legally, access to closed data is restricted, and data journalists must navigate ethical guidelines when dealing with sensitive information. Closed data, often requiring specialized programming skills to access, presents legal and practical challenges. Data must be systematized and organized for effective use.

For data journalists in Kazakhstan, working with open but unstructured data is a common scenario. For instance, data on traffic accidents in Almaty might not be systematically organized but can be gathered from various sources like news websites. By aggregating and organizing this data, journalists can identify patterns, such as accident hotspots. Similarly, open data on cinema schedules might be available but not structured. Tools like Python and MySQL can be used to organize and analyze such data.

A significant challenge is the inconsistency in data representation, especially names. In Kazakhstan, names might be recorded differently across sources (e.g., full names vs. abbreviations). This inconsistency complicates the process of data searching and integration, making it time-consuming to compile accurate information.

Effective data journalism in Kazakhstan is hindered by the limitations in data openness and the inefficiencies in accessing and organizing data. Despite these challenges, there are opportunities for data journalists to leverage available tools and methodologies to enhance the accessibility and usability of data. Addressing these challenges requires a concerted effort to improve data transparency, update frequency, and systematization practices.

Conclusion

In concluding the research on Kazakhstan's open data platform, several recommendations are proposed. The open data portal administration has indicated that they eagerly anticipate feedback and suggestions for improvement: "We eagerly and curiously await your thoughts and comments on the open data portal" (data.egov.kz, 2019).

1. Ensure Default Openness of Data:

Data should be open by default. The government should work towards creating a unified information hub that integrates open data portals across all governmental agencies. While this work is ongoing, the pace of these efforts needs to be accelerated.

2. Enhance Functionality:

The functionality of the platform needs thorough refinement. All filters and buttons should be tested for their operational effectiveness. Ensuring that users can efficiently search and analyze data is critical for the platform's usability.

3. Maintain Application Functionality:

Applications advertised on the site must be functional. If they do not work properly, it is better not to advertise them at all. Ensuring that all applications are reliable and useful should be a priority.

4. Improve Data Quality:

The quality of data needs significant improvement. For instance, the [budget.egov.kz] (https://budget.egov.kz/) portal exists, but the actual data is lacking. There is a need to increase the comprehensiveness and accuracy of the data provided.

5. Include Private Sector Organizations:

It is essential to involve not only governmental bodies but also private organizations in the open data ecosystem. Encouraging private entities to contribute and work with open data will enhance the overall data landscape.

The pace of development in data journalism in Kazakhstan has notably accelerated over the past decade. This trend is closely linked to advancements in digital technologies and Kazakhstan's emphasis on digital systems. It is also important to highlight the significant attention given to the IT sector in the country. If this momentum continues, it could potentially facilitate easier access to information for data seekers in the future.

Moreover, Kazakhstan does not impose restrictions on the dissemination of information through social networks, informational websites, or other dissemination tools, as long as the information does not violate Kazakhstani legislation. Therefore, data seekers have a broad range of sources to access data. However, difficulties in accessing information, particularly regarding "Public Procurement" and reports from governmental agencies, are often due to information holders not fulfilling their responsibilities adequately.

Currently, there is a lack of educational materials on data journalism developed by Kazakhstani scholars in the curriculum of higher education institutions. While foreign educational resources can be used for training data journalists, there are unique aspects of Kazakhstan's digital system, transparency policies, and governmental operations that necessitate localized educational tools and materials.

Information about author.

O.M. Abdikhalyk – comprehensive literature review, collection and analysis of data, conducting practical research, and preparation of the manuscript for publication.

A.T. Beldibekova – defining the objectives and tasks of the scientific article, utilizing the material effectively and contributing to the conceptual framework of the research.

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Л.Н. Гумилев атындағы Еуразия ұлттық университетінің ХАБАРШЫСЫ.
ЖУРНАЛИСТИКА СЕРИЯСЫ
ISSN: 2616-7174. eISSN: 2663-2500

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Дата журналистиканың жұмыс істеу принциптері

Аңдатпа. Мақалада Қазақстандағы деректер журналистикасының дамуы және оның қолдану ерекшеліктері талданады. Деректер журналистикасы ақпаратты жинау, талдау және визуализациялау арқылы оны тиімді өңдеуге мүмкіндік береді. Python, Excel, Tableau сияқты заманауи құралдар журналистердің жұмысын жеңілдетіп, ұсынылған деректердің дәлдігін арттырады. Қазақстанда деректердің қолжетімділігі артып келе жатқанымен, деректер журналистикасы ақпарат көздерінің шектеулігі немесе олардың қолайсыз форматта берілуі сияқты қиындықтарға тап болады. Халықаралық тәжірибеде ашық деректер порталдары арқылы ақпаратқа қолжетімділік айтарлықтай жеңілдетілген. Қазақстанда да мұндай дереккөздер саны өсіп келеді, бұл журналистердің ақпаратқа қол жеткіз умүмкіндіктерін кеңейтуде, алайда бұл сала әлі даму сатысында тұр. Деректер журналистикасы ақпаратты тек мәтін түрінде ғана емес, инфографика, диаграмма сияқты визуалды құралдарар қылы да жеткізіп, оны қабылдауды жеңілдетеді. Зерттеу нәтижелері көрсеткендей, Қазақстанда деректер журналистикасы — ғаламдану мен жаңа технологиялардың ықпалымен дамып келе жатқан жаңа бағыт. Оның ақпараттық дәуірдегі маңызы мен даму перспективалары барған сайын айқын байқалуда.

Түйін сөздер: дата журналистика, ашық деректер, деректерді талдау, деректерді визуализациялау, интерактивті графика.

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Принципы работы дата журналистики

Аннотация. В статье анализируется развитие дата-журналистики в Казахстане и её особенности применения. Дата-журналистика помогает эффективно обрабатывать информацию через сбор, анализ и визуализацию данных. Использование современных инструментов, таких как Python, Excelи Tableau, упрощает работу журналистов и повышает точность представленных данных. В Казахстане наблюдается рост доступности данных, однако в сфере дата-журналистики существуют проблемы, связанные с ограниченностью источников или неудобными форматами предоставления информации. В международной практике доступ к данным облегчается за счёт открытых порталов. В Казахстане количество таких источников также растёт, улучшая возможности журналистов, но эта область всё ещё находится на этапе становления. Дата-журналистика предоставляет информацию не только в текстовом формате, но и через визуальные средства, такие как инфографика и диаграммы, что упрощает её восприятие. Исследование показывает, что дата-журналистика в Казахстане – это новая, развивающаяся дисциплина,

на которую влияют глобализация и новые технологии. Её значимость в эпоху информации и перспективы развития становятся всё более очевидными.

Ключевые слова: дата-журналистика, открытые данные, анализ данных, визуализация данных, интерактивная графика.

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