

*Information logistics – the most valuable commodity of the 21st century***Logistyka informacji – najcenniejsza w XXI wieku****Piotr Kardasz¹, Marcin Skocz², Ewa Kardasz³, Piotr Jednaszewski⁴**

ABSTRACT: The first part of the article describes a new field of science, which is information logistics, and its expected role in the future. The overflow of information and the tools that create it are characterized: algorithms, bots, clickbaits, trolling and social media. Subsequently, the increasing importance of critical thinking in modern times was pointed out. The second part of the article describes the role of information logistics in an enterprise. The attention was paid to: the importance of systemic management of information flow in business, the conditions of an appropriate information flow in the enterprise, and the loss of information in the communication process. The third part of the article highlights the importance of information logistics in e-commerce companies. It also provides tips on how to take care of information logistics in e-commerce companies and characterizes the benefits of using information logistics in this type of enterprises.

STRESZCZENIE: W pierwszej części artykułu opisano nową dziedzinę nauki, jaką jest logistyka informacji, oraz jej przewidywaną rolę w przyszłości. Scharakteryzowano w niej nadmiar informacji i narzędzia, które go tworzą: algorytmy, boty, clickbait, trolling i social media. Następnie wskazano wzrastające współcześnie znaczenie krytycznego myślenia. W drugiej części artykułu opisano rolę logistyki informacyjnej w przedsiębiorstwie. Zwrócono uwagę na znaczenie systemowego zarządzania przepływem informacji w biznesie, warunki prawidłowego przepływu informacji w przedsiębiorstwie oraz utratę informacji w procesie komunikacji. W trzeciej części artykułu podkreślono znaczenie logistyki informacji w firmach e-commerce. Zawiera ona również wskazówki, jak zadbać o logistykę informacji w firmach e-commerce, oraz charakteryzuje korzyści płynące z zastosowania logistyki informacji w tego typu przedsiębiorstwach.

KEYWORDS: information, logistics, internet, e-commerce

SŁOWA KLUCZOWE : informacja, logistyka, internet, e-commerce

1. Information logistics in everyday life**1.1. Information overflow as one of the most popular phenomena on the Internet**

The 20th and 21st centuries is a time of dynamic development of civilization and technology. The automated world is built not only on many amenities, but also on threats. Such convenience is, for example, the Internet, which is a broadly understood source of knowledge available at any time and almost anywhere in the world. On the other hand, the threat is the surfeit of information (both valuable and completely worthless), with which – whether we like it or not – we deal with every day. Our decision-making often depends on who, when and with what content. The basic problem resulting from noticing information overload and its impact on us is finding answers to several questions⁵. The most important of them are as follows:

- How to distinguish between real information and fake news without time-consuming and laborious analysis?

- How to prevent social media from being used to influence public opinion, including ourselves?
- How to recognize the manipulation techniques constantly used in the network?
- How not to succumb to the above-mentioned manipulation techniques?
- How to reach only important and true information – both in life and in business?
- How to use this information in traditional business?
- How to use this information in the e-commerce business?

The answers to all of the above questions are provided below.

1.2. Information logistics – the answer to the problem of information overload

In the formulation of answers to the above questions, it

1. Wrocławska Wyższa Szkoła Informatyki Stosowanej we Wrocławiu, e-mail: pkardasz@horyzont.eu, ORCID 0000-0002-0933-3384.

2. Semper Avanti, e-mail: marcin.skocz@semperavanti.org, ORCID 0000-0002-9302-5762.

3. Fundacja Badań Rozwoju i Innowacji, e-mail: sekretariat@fbri.pl, ORCID 0000-0003-2038-8228.

4. St. Mary's Academy Ltd., e-mail: peterjednaszewski@gmail.com, ORCID 0000-0003-1061-907X.

5. *Fake news, czyli jak manipulując informacją zdobyć nas w sieci*, <http://fundacjawspomaganiawsi.pl/fake-news-czyli-jak-manipulujac-informacja-zdobyć-nas-w-sieci/> [access: 28.09.2021]

may be helpful to delve into a new, still unexplored field of knowledge, which is information logistics – the subject of this article. Information logistics is sometimes called the „most valuable commodity” for humanity in the 21st century. In order to properly select information, you need to be aware of the ways that web developers influence our decisions. These methods are mainly:

- algorithms,
- bots,
- clickbaits,
- trolling,
- social media (for example Facebook).

All of them are briefly described below.

1.3. Algorithms

The use of digital technologies is associated with leaving behind digital traces, and thus – being „tracked” by algorithms. What are algorithms? These are activities aimed at completing a task or solving a problem in the shortest possible time. Algorithms are used, among others, in the activities of the most popular Internet search engine, which is Google. For example, Google uses them to assess the usefulness of websites (the main factor is the quality of the content available on them) and try to understand the intentions of users who search for certain terms (these are keywords and key phrases). Algorithms, however, pose certain dangers. Firstly – owners of some websites attempt to manipulate ranking factors (for example, by saturating texts with frequently searched keywords and key phrases while „missing” the topic and the resulting disappointment of users with the content on the website). Secondly, they often collect and use information about us, not necessarily with our consent. How to avoid it? It is impossible to completely escape from algorithms.

1.4. Bots

Bots, also known as internet robots, are programs whose purpose is to perform specific actions on the web. These actions are typical of live users.

These can be activities such as:

- browsing websites,
- searching for information on websites,
- downloading files,
- issuing grades,
- writing comments,
- conducting conversations (to conduct conversations, which is a demanding task, special bots, i.e. chatbots and voicebots are used).

Bots now account for over 50 percent of all web traffic.

Therefore, it is worth bearing in mind that many ratings or opinions that we meet on the Internet are made not only by live users, but also bots.

1.5. Clickbaits

These are content whose primary purpose is to grab the audience’s attention. Typically, such content has a shocking, sensational title and / or thumbnail. Typical for click-

baits are:

- arousing curiosity, which is a natural human trait;
- awakening emotions and desires;
- spreading fake news (i.e. false or partially untrue information aimed at obtaining financial, political or prestigious benefits);
- disinformation;
- the intensity of graphics: colours, fonts and others;
- general „flashiness”.

Clickbaits often „offer” easy, fast and cheap (even free) solutions to problems, e.g.:

- „Check how to lose weight without exercising” (easy solution);
- „We know a way to earn a large amount of money in a few days” (quick solution);
- „Free English language course” (free solution).

They are usually in the form of exclamation points (purpose: shock, sensationalism) or interrogative sentences (purpose: arousing curiosity and emotions), e.g.:

- „It's unbelievable!”;
- „You just have to see it!”;
- „How did he do it?”;
- „How did it even happen?”

Why are clickbaits usually unsuccessful? There are at least several reasons. First – they often do not keep the promise contained in the title (obtaining the answer to the question). Second, they mislead the reader. Third, they contain manipulation, half-truths, or even lies. Fourth – being worthless information built on exaggeration and exaggeration, they simply waste our time and, in turn, cause irritation. Clickbaits are, of course, one of the most popular solutions that generate high traffic on popular websites that are full of them. However, anyone looking to source only high-quality content should avoid it⁶.

1.6. Trolling

Trolling is the behaviour of focusing the attention of network users on themselves, and then causing them irritation and anger. It is especially visible in chat rooms, internet forums and in those parts of the network where discussions are held (for example, YouTube). This behaviour is known as anti-social. People characterized by narcissism, Machiavellianism, psychopathy and sadism often admit that trolling is an extremely popular Internet activity.

1.7. Social media as a source of knowledge about us

It is also worth emphasizing that social media, such as Facebook, use knowledge about us for marketing purposes. How does it happen? An example is the initiative of scientists from the University of Cambridge, who several years ago sent a personality test to a huge number of Facebook users. Thus, Facebook obtained information about the preferences and tastes of many of its users. This information, in turn, allowed, among other things, to infer this:

6. *Clickbait – co to jest?*, <https://www.artefakt.pl/blog/epr/clickbait-co-to-jest> [access: 28.09.2021].

- what sexual orientation individual users have,
- what is their emotional profile,
- do they suffer from personality disorders, and if so – what (present),
- if they have anxiety, and if so, what are they caused by (past).

Many Facebook users did not complete the test, but they spread information about themselves daily by adding vacation photos, talking about changing jobs, liking fan pages about political and social topics or simply subscribing to certain groups and taking various activities on them. Of course, the more we know about us, the easier it is to reach us and manipulate us in turn. This is evidenced by the scandals regarding the legitimacy of Brexit and the 2017 US presidential election. Opponents of the UK's exit from the European Union and people who undermine the democratic nature of the US elections still talk about using information about Facebook users for propaganda and unethical purposes⁷.

1.8. How to deal with information overload, i.e. what is critical thinking

The human brain, when a person begins to think critically, i.e. not only absorb content, but also select and evaluate it, uses a lot of energy. Interestingly, the brain, which makes up just 2 percent of body weight, consumes about 25 percent of all our energy. This, in turn, causes fatigue and makes us want to „take shortcuts”, and thus – end the process of assimilating and half-memorizing, and give up selection. Such „shortcuts” only benefit the brain in a short time. In the long run, critical thinking:

- increases the number of neural connections, and in turn „develops” and „trains” our brain;
- arouses our curiosity, the satisfaction of which contributes to the feeling of happiness;
- slows down the ageing process.

1.9. What else prevents us from critical thinking, i.e. about emotions

The brain's tendency not to overexert is one of the two most important reasons that keep us from thinking critically. The second reason is the fact that very often emotions take over and make the reception of reality as it is difficult. This is because man by nature makes emotional, not rational, decisions. However, anyone who wants to be guided primarily by understand must constantly allow himself to think that his emotions are telling him not to make the best decisions.

1.10. „Think about how to think”, „think before you think”

These slogans are at the heart of critical thinking, which is and will certainly be one of the most desirable competences of the 21st century – both in everyday life and at work. How to think critically?

You need to:

- understand positions presented in texts;
- study and evaluate arguments, especially opposing ones;
- recognize persuasive and manipulative techniques;
- independently think about the problems described in the texts;
- create your positions supported by a thorough reading of the text and its structure;
- know and use the rules of logic.

2. Information logistics in the enterprise

2.1 Systemic management of information flow in business

The information we deal with daily includes manipulations, half-truths, and often lies. Appropriate selection of information is therefore a challenge for each of us. One more aspect related to information is worth emphasizing, namely – the management of the information system in the business. From the perspective of everyone – macro, small, but above all medium and large enterprises, system management of the information system is crucial for business development.

2.2. What is the information flow in the enterprise?

As Zbigniew Wąsik and Zbigniew Kotulski write in the article in the publication *Zarządzanie przedsiębiorstwem w warunkach konkurencji*, information flowing and collected in the enterprise becomes knowledge [...] necessary for making decisions, i.e. the so-called „know-how”, later it may constitute technical knowledge, which is a permanent asset of the enterprise, subject to protection as intellectual property⁸. However, in order for it to be as written by Wąsik and Kotulski, i.e. that the obtained data could constitute a solid basis for making the best possible decisions, the flow of information in the enterprise must meet certain, strictly defined conditions.

2.3. Conditions for the proper flow of information in the enterprise

Following Wąsik and Kotulski, there are seven basic conditions for the proper flow of information in an enterprise. They are described below.

- 1) The flow of information must be clear, transparent, understandable for each employee.
- 2) It should be very precise what each participant of the information flow is responsible for.
- 3) The company should introduce the standardization of the message, and thus – the flow of information – terms, signals, systems. This standardization will fully or partially exclude communication disruptions among employees.
- 4) It should be remembered that the transfer of information will take place in two ways – in a standardized manner

⁷ *Czy powinniśmy skasować Facebooka? Co tak naprawdę zrobiła Cambridge Analytica*, <https://technologia.dziennik.pl/internet/artykuly/571389,cambridge-analytica-facebook-afera-usa.html> [access: 28.09.2021]

⁸ Z. Wąsik, Z. Kotulski, *Przepływ informacji w przedsiębiorstwie zarządzanym systemowo* [in:] *Zarządzanie przedsiębiorstwem w warunkach konkurencji*, Wydawnictwo Instytutu Podstawowych Problemów Techniki Polskiej Akademii Nauk, Olsztyn 2002, p. 439.

(which will improve the quality of communication), and also in a spontaneous manner (which will introduce the so-called information noise and which poses a threat to the company related to lowering the effectiveness of its functioning).

5) In the flow of information, information noise should be avoided at all costs, as its negative consequences are manifested primarily in extreme conditions such as breakdowns, additional orders, shortening standard delivery times, new customer requirements combined with short lead times, etc.

6) The area not covered by the systemic management of information flow in the enterprise should be as small as possible.

7) The area covered by the systemic management of information flow in the enterprise should be as large as possible⁹.

2.4. Loss of information in the communication process

When writing about information logistics in an enterprise, it is impossible not to mention the loss of information in the communication process:

- when we speak, we do not pass on about 2 percent of the information we planned to provide (98 percent remain);
- when someone listens to us, they „lose” 1.96 percent of our message on average (96.04 percent remain);
- understanding our speech causes further „losses” – on average 1.92 percent of the message (94.12 percent is left);
- the issue of not accepting some parts of our statement is another „loss” – 1.88 percent (92.4 percent left);
- when the task is performed by only one person, an average of 1.84 percent of the message is captured (90.39 percent is left);

As you can see, the communication process is quite complex and at each of its stages, new „losses” are visible, which make a given task deviate more and more from how it was supposed to be performed in an exemplary manner. In order to minimize these „losses”, it is necessary to use the solutions offered by information logistics¹⁰.

3. Information logistics in e-commerce companies

3.1. The role of information logistics in e-commerce companies

Currently, the overwhelming number of enterprises dealing in the broadly understood trade have expanded their activities or completely transferred them to the Internet, thus joining the dynamically developing group of e-commerce companies around the world. This is a response to the

fact that an increasing percentage of the population has access to the Internet and to the fact that the value of the e-commerce market, both in Poland and abroad is growing all the time¹¹. This was also significantly influenced by the COVID-19 pandemic. The role of information logistics in e-commerce businesses is huge. This is because society in Europe (and not only) has been an information society since the 90s, and thus – eagerly uses modern, developed means of communication and information processing.

3.2. How to take care of information logistics in e-commerce companies?

Since the role of information logistics in e-commerce businesses is crucial, it is necessary to consider how to effectively implement its solutions in the enterprise. Below are five such examples.

1) CRM system – allows you to build relationships between the company and customers, get to know them, gain trust, strengthen relationships.

2) Google Analytics statistics systems – their role is to obtain specific information about potential customers. These are mainly: gender, age, location, interests, searches.

3) Google AdWords and AdSense advertising systems – through them you can find out what type of advertisement is best perceived by users (text advertisement, graphic advertisement, video advertisement), and at what time it should be broadcast to bring the best possible results.

4) Mailing systems – thanks to them, it is possible to examine which topics are of interest to customers and which are not, and which devices are most often used by users. This is the basic information in the process of optimizing the website.

5) Social media – a company that uses social media such as Facebook or Instagram has access to a lot of information about its customers, which can be used in turn by creating advertisements and modernizing the offer¹².

3.3. What are the benefits of using information logistics solutions?

There are many benefits to using information logistics solutions. The most important of them are:

- more effective price management over time;
- more effective use of the advertising budget;
- getting to know customers better, their preferences and expectations;
- the ability to predict customer actions;
- the ability to create a personalized sales offer;
- optimizing the purchasing path;
- reduction of conversion costs;
- improvement of the supply chain management process¹³.

Moreover, the use of information logistics solutions allows enterprises to build a sustainable competitive advantage. This advantage is the source of business success¹⁴.

9. *Ibidem*, p. 7.

10. A. Letkiewicz, A. Mytlewski, *Logistyka informacji w procesach podejmowania decyzji*, „Zeszyty Naukowe Uniwersytetu Gdańskiego” 2005 (30), p. 188.

11. D. Weiland, *Logistyka informacji jako podstawowy element w budowaniu przewagi konkurencyjnej w e-commerce* [in:] „Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach” 2016 (306), p. 104.

12. *Ibidem*, p. 107–108.

13. *Ibidem*, p. 108.

4. Conclusions

Information logistics, used both in everyday life and in professional life, including e-commerce enterprises, is becoming an increasingly important element and there is no sign that this will change. Calling it „the most valuable commodity of the 21st century”, although for some it may be too far-reaching thesis, for more and more people becomes fully justified. Information logistics is very likely to become one of the most studied and used fields of science in the near future¹⁵.



Zezwala się na korzystanie z *Information logistics – the most valuable commodity of the 21st century* na warunkach licencji Creative Commons Uznanie autorstwa 4.0 (znanej również jako CC-BY), dostępnej pod adresem <https://creativecommons.org/licenses/by/4.0/pl/> lub innej wersji językowej tej licencji lub którejkolwiek późniejszej wersji tej licencji, opublikowanej przez organizację Creative Commons.

Bibliography

1. Chaberek M., *Logistyka informacji zarządczej w kontrolingu przedsiębiorstwa*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2001.
2. *Clickbait – co to jest?*, <https://www.artefakt.pl/blog/epr/clickbait-co-to-jest> [access: 28.09.2021].
3. *Czy powinniśmy skasować Facebooka? Co tak naprawdę zrobiła Cambridge Analytica*, <https://technologia.dziennik.pl/internet/artykuly/571389,cambridge-analytica-facebook-ok-afery-usa.html> [access: 28.09.2021].
4. *Fake news, czyli jak manipulując informacją zdobyć nas w sieci*, <http://fundacjawspomaganiawsi.pl/fake-news-czyli-jak-manipulujac-informacja-zdobyc-nas-w-sieci/> [access: 28.09.2021].
5. Kozłowski R., Sikorski A., *Nowoczesne rozwiązania w logistyce*, Wydawnictwo Wolters Kluwer, Warszawa 2013.
6. Letkiewicz A., Mytlewski A., *Logistyka informacji w procesach podejmowania decyzji*, „Zeszyty Naukowe Uniwersytetu Gdańskiego” 2005 (30), p. 183–198.
7. Wąsik Z., Kotulski Z., *Przepływ informacji w przedsiębiorstwie zarządzanym systemowo* [in:] *Zarządzanie przedsiębiorstwem w warunkach konkurencji*, Wydawnictwo Instytutu Podstawowych Problemów Techniki Polskiej Akademii Nauk, Olsztyn 2002, p. 439–450.
8. Weiland D., *Logistyka informacji jako podstawowy element w budowaniu przewagi konkurencyjnej w e-commerce* [in:] „Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach” 2016 (306), p. 97–110.

14. M. Chaberek, *Logistyka informacji zarządczej w kontrolingu przedsiębiorstwa*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2001, p. 49.

15. R. Kozłowski, A. Sikorski, *Nowoczesne rozwiązania w logistyce*, Wydawnictwo Wolters Kluwer, Warszawa 2013, p. 81.