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Additional information and an imprint – p. 53

CONTENTS

From the Editorial Committee

We are giving you the next Vol. 27, No. 4(2022) issue of the Quarterly of the Faculty of Management of the Rzeszow University of Technology entitled “Modern Management Review”.

The primary objective of the Quarterly is to promote publishing of the results of scientific research within economic and social issues in economics, law, finance, management, marketing, logistics, as well as politics, corporate history and social sciences.

Our aim is also to raise the merits and the international position of the Quarterly published by our Faculty. That is why we provided foreign Scientific Council, as well as an international team of Reviewers to increase the value of the scientific publications.

The works placed in this issue include many assumptions and decisions, theoretical solutions as well as research results, analyses, comparisons and reflections of the Authors.

We would like to thank all those who contributed to the issue of the Quarterly and we hope that you will enjoy reading this issue.

With compliments
Editorial Committee

MODERN MANAGEMENT REVIEW **2022**
MMR, Vol. 27, No. 4(2022), pp 7-17 **October-December**

Oscar GONZALEZ FLORES[1]

TOPIC MODELING: THE USE OF MACHINE LEARNING AND REFERENCE MANAGEMENT SYSTEMS IN THE AREA OF INTERNATIONALIZATION OF SMALL AND MEDIUM ENTERPRISES (SMES)

The objective of this paper is to find new trends in the literature using machine learning and reference management systems within the theme of the Internationalization of Small and Medium Enterprises (SMEs). With help of topic modeling software 857 articles on the topic "Internationalization of SMEs from 2012 to 2021 were analyzed and ranked (citation index) through Endnote® library management systems. The search was focused only on the fields of social science and management. 85 documents were shortlisted from the original cluster to proceed with the text mining. Results show promising areas of research within the Internationalization of SMEs. Stand-out topics include Resource-based Theory, Dynamics Capabilities, International Entrepreneurship, and Ambidexterity among others.

Endnote® Subject Bibliography found the most popular words and topics in the original database. Results showed that using Endnote® and MALLET topic modeling tool it is possible to analyze large amounts of publications and find new trends within a specific field. However, MALLET software needs experts in the field to identify and translate results into meaningful ideas. Endnote® seems to have a higher level of sophistication and a better visual interface, but among the disadvantages are the price of the tool and that it works better with their libraries or partner journals.

Keywords: Internationalization, SMEs, MALLET, Endnote, Survey Literature.

1. INTRODUCTION

Nowadays young generation individuals are deeply interrelated with technology, the internet, and smartphones. Members of these groups are generally satisfied with their level of integration with technology in their daily life. However, researchers might be cautious when using web 2.0 tools in their doctoral research, due to financial constraints, lack of technological expertise for both the students and institutions and limited guidance from their supervisors during the early stages of research.

Carpenter (2012) found in the London study that more than 27% of Ph.D. students had not used any technology aid for the research. Furthermore, the study showed that citation

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and reference management systems (Endnote®, Mendeley, RefWorks etc.) are the preferred technologies (58%), and other types of tools were used by 10% of the responders or less. Some librarians find Endnote® a great resource for academic research, especially for systematic reviews. However, it is also considered to be not intuitive, especially for first-time users who need specific training and supervision to kickstart literature analyses (Gotschall, 2021).

Lately, the use of machine learning applied for research is growing (Qiang, Qian, Li, Yuan, Wu, 2020). Machine learning through topic modeling determines a theme from words that are part of texts. It reads hundreds of thousands of documents and figures out which words in those documents are related. After that, the system interprets topics by ranking keywords that are more likely to appear to be repeated (Block, 2006). An experienced scholar may use those words to title each list with a meaningful heading that can be used for further analysis.

In the words of Meeks and Weingart (2012), Topic Modelling is *"a distant reading in the purest sense"* usually, being able to see the big picture helps researchers to figure out a complex situation. However, getting conclusive results from Topic Modeling is practically impossible because it requires much intangible information like intuition and creativity. Still, it is a helpful exercise that uses complex formulae, algorithms, statistics, and probabilities to analyze large amounts of words and produce intercorrelated words that can be translated into new topics and research trends in literature.

Finding new trends in the literature is a difficult time-consuming task that might result in a loss of motivation and frustration for researchers. Using topic modeling software can help to find meaning in keywords that are generally taken for granted while easing the task of reading hundreds of documents.

The *Topic Modeling tool* is a graphical user interface for MALLET (Machine learning for language toolkit) developed by McCallum (2002). Also, the tool gets together the words that are likely to emerge in a collection of documents. The tool uses machine learning and analytics to find some repetitive ideas or topics in a series of text documents through a process called "text-mining". Such a task must be done by a specialist who knows the topic to discern meaningful or logical ideas (Block, 2006).

According to the software developer Enderle (2017), a topic model is a

> Simplified representation of a collection of documents. Topic modeling software identifies words with topic labels, such that words that often show up in the same document are more likely to receive the same label. It can identify common subjects in a collection of documents clusters of words that have similar meanings and associations and discourse trends over time and across geographical boundaries.

Some bibliometric companies try to emulate this process by using their software to ease the gathering and analyzing of information. Reference management tools provide aid for different purposes in research and writing. Take, for example, Clarivate Analytics (2021) which provides a wide range of services to collect (Web of Science®), order (Endnote®), analyze (Reference summary®) and cite (Cite while you write®) references while using the word processor.

The objective of this paper is to find new trends in the literature using machine learning and reference management systems within the theme of the Internationalization of Small and Medium Enterprises (SMEs). The process includes collecting and analyzing

publications through Endnote® (Analytics, 2021) and topic modeling using MALLET software (Enderle, 2017).

2. METHODS

2.1. Topic Modeling

The collection of the latest articles about "Internationalization of SMEs" was done using web databases of academic literature. Search engines were used, including Google Scholar, Elsevier, Web of Knowledge, SCOPUS, EBSCO, and Science Direct. The search parameters were "Internationalization of SMEs". A first exploration displayed hundreds of documents. A second exploration was needed to assure that the maximum of documents, applying different terminologies, using the British variation of "Internationalisation of SMEs", and selecting documents "Internationalization" plus suffix "small" "medium" and "firms" on their titles. The first filter selected only documents in the Management Sciences field. The second criterium is that those articles should be from the last 10 years (2002––2021). The final selection consisted of 857 documents.

Considering the relevance to the topic and the number of citations, the upper 10% of the most cited documents according to the web of science (Analytics, 2021) were selected from the original database. The next step following the guide for topic modeling (Enderle, 2017) is to convert the pdf into text files to run the software. 85 abstracts of the selected papers were collected individually and transformed in the right format according to the developer or standard text file (.txt), usually a document that contains simple text and can be opened in programs like Microsoft Notepad® or Apple TextEdit®. All the files are in lowercase letters, to standardize the words and be able to identify them from the human labeling titles (in capital letters).

2.2. MALLET Commands

- Select the input folder of 85 text files;
- Choose the folder to output the results;
- The output settings included the number of topics 50, with 1000 iterations and 20 words on each cluster.

The articles and pronouns i.e., a, an, the, with, him, her, etc., were filtered out since those are very common words in the English language and might mislead the results.

After MALLET produced topic clusters, they were interpreted. The final analysis was shortlisted into 10 clusters according to relevance to the literature and translated into titles with a brief explanation of their relation/congruence with Internationalization theories.

2.3. Subject bibliography

As a matter of comparison, a second analysis was done, *"Subject Bibliography"* of Endnote® (Analytics, 2021), which attempts to identify the most common words or phrases in a library. The same database of 857 papers was used for the topic modeling exercise. Those articles were part of a reference library saved on Endnote® X9. Each reference contains information that can be included during the analysis. There are two variables to consider: Keywords and Titles, the software produced interconnected keywords. Furthermore, the results were contrasted against the topic modeling outcomes of the MALLET tool and discussed their importance in the field.

3. FINDINGS

3.1. Topic Identification

While the number of outputs was specified by MALLET, the topic-model tool determined the content of each topic without human interaction. The software produced an output of 50 topics with 20 words each. Randomly, these variables were changed to see if the outcome differs significantly. No significant variations were detected. MALLET produced a series of topics using keywords from the abstracts that might be clustered according to the probability that they come up together. By looking at the top 10 to 15 keywords, a scholar can catalog those according to their relevance within the Internationalization of SMEs study.

As a result of the first analysis, out of the initial 50 topics, a shortlist of 10 topics was chosen according to their relevance to the literature. Later, those clusters of words were translated into titles with some brief explanations of their importance/congruence with Internationalization theories and references that support those topics.

3.2. Results and analysis of topics

It is important to show what kind of word clusters can be generated when using machine learning. The following paragraphs will show some ideas developed from ten chosen lists of topics/words (*italics*) produced by the topic model tool. After a careful analysis, each cluster is titled (CAPITAL) from research areas, views, and methodologies, that are supported by a literature review. A brief discussion on the importance of these titles is provided after each title.

The order of the selected clusters of words was considered randomly and not according to their value. During this stage, the academic and theoretical value must be evaluated according to the prior knowledge of the evaluator (Block, 2006).

INTERNATIONALIZATION OF SMALL FIRMS AND THE RESOURCE-BASED VIEW

3 | based | resource | dynamic | concept | international | provide | theories | shed prescriptions | increasingly | basic | activity | make | small | upgrade

The resource-based view theory was developed by Barney (1991) from the philosophies of Wernerfelt (1984) and has been linked with the topic of internationalization (Chung, Ding, Ma, 2019; Kahiya, 2018). The theory assumes that firms need and possess resources and are distributed heterogeneously. The way that organizations utilize those resources to perform better is what separates successful firms from mediocre ones (Gupta, Malhotra, Czinkota, Foroudi, 2016; Szerb, Ulbert, 2009).

DYNAMIC CAPABILITIES THEORY TO SUSTAIN COMPETITIVENESS

6 | capabilities | dynamic | main | contingent | output | sustain | competitiveness | rival | ten | nurtured | incomplete | exhibit | disruption | contingency

The Dynamic capabilities theory is trending nowadays as part of the Resources-based theory (Santos-Arteaga, Torrecillas, Tavana, 2019; Kim, 2018). The theory developed by Teece, Pisano, and Shuen (1997) explains how organizations use specific capabilities to sense, seize and identify threats or contingencies from rivals (Teece, 2007; Eisenhardt, Martin, 2000).

NEW MARKET ENTRANTS AND THEIR RELATIONSHIP WITH INTANGIBLE RESOURCES OF SMES
9 | business | resources | marketing | relationships | red exchange | managerial | identifies | emerged | economics | goods | intangible | entrants | unclear | explorative | multiple |

The mode of how new entrants explore foreign markets is a topic discussed widely in the past years (Surdu, Mellahi, 2016). Among the two theories of SMEs' internalization, the first one promotes a gradual process of the firm acquiring knowledge to exploit it later (Dow, Liesch, Welch, 2018) or the so-called Uppsala Model (Johanson, Vahlne, 1977). The second one is the Born-global theory which assumes that international organizations gather the necessary knowledge and resources to venture abroad sharply (Knight, Cavusgil, 2004).

THE ENTREPRENEURSHIP RESOURCES BOTTLENECK APPROACH TO INCREASE COMPETITIVITY IN SMEs
14 | institutional | systems | entrepreneurship | national | outcomes | approach | individual | opportunity | SMEs | specific | action | types | institutions | country | exist | bottleneck | methodology | introduce

The highly cited paper *"National Systems of Entrepreneurship"* (Acs, Autio, Szerb, 2014), with an average yearly citation index of 30.0 (Analytics, 2021), brings to the table a method of ten pillars to quantify Entrepreneurship, with the Internationalization as one of those pillars (Ács, Szerb, 2007).

INTERNATIONALIZATION OF FIRMS IN EMERGING ECONOMIES
16 | emerging | economies | strategies | theoretical | perspectives | explained | investigates | strategy | ideas | forum | primary | liberalization | settings | America | Latin | derived | vulnerable

From a first look, it appears that many of the articles on the analysis are related to emerging economies. There is a rising interest to study the internationalization of SMEs in developing countries like China, India, Singapore, India, Taiwan, Brazil, Chile, and Mexico (Chung et al., 2019; Nguyen, Le, 2019).

DETERMINANTS FOR INTERNATIONALIZATION ON SMES
23 | exports | order | suggest | diversified | internalization | insights | trade | determinant | presence | contained | smes | channel | antecedent

The assessment of the level of international involvement for SMEs is also known as the degree of internationalization (Gulanowski, Papadopoulos, Plante, 2018; Banno, Piscitello, Varum, 2015). One way to measure it is through the level of export performance (Boehe, Jimenez, 2018; Kiss, Fernhaber, McDougall-Covin, 2017).

INTERNATIONAL AMBIDEXTERITY. EXPLORATION AND EXPLOITATION OF CAPABILITIES

28 | capability | building | exploitation | mode | process | organizational | mne | role | local | managers | analysis | networks | external | threats | quality | interactions | coordinated | organization

The original paper of March (1991) proposed the idea that managers should have ambidexterity skills. O'Reilly 3rd and Tushman (2004) made the topic popular when the Harvard Business Review published it. The theory implies that to have successful firms the leader should be able to explore new markets and exploit them while being aware of the risks and challenges that involve competing in foreign locations (Jimenez, Boehe, 2018; Vahlne, Jonsson, 2017).

THE ICTS LIKE A CRITICAL SUCCESS FACTOR TO IMPROVE DEVELOPMENT

38 | group | higher | factor | reference | developed | contributions | scale | csf | notion | article | relevant | superior | focal | states | icts | converge | terms | profit | run

Some factors endorse success in firms, while others are related directly to the entrepreneur's capabilities (Bai, Holmstrom-Lind, Johanson, 2018; Lopez, Torres, 2017), also known as critical success factors (CSF). Information and communication tools (ICTs) promote new networks and strategic alliances in international markets (Hui, Leong, 2016).

CHINESE FIRMS AND THEIR EARLIER ACCESS TO NEW MARKETS

40 | development | countries | empirical | economic | examines | review | process | question | future | growth | addition | included | exists | reserved | contribution | Chinese | earlier | firms | taking | type

China has become important in the global markets (Li, Ding, 2013). This economic blizzard has dragged SMEs and lots of research to be conducted at Orient latitudes. Many of the papers discussed the effects of internationalization on China, and how it affects the regions or the process of development of the country (Qiao, Fung, Ju, 2013).

ENTREPRENEURIAL ORIENTATION. INTERNATIONALIZATION PERFORMANCE OF SMES

50 | performance | entrepreneurial | orientation | internationalization | SMEs | direct | survey | suggest | network | influenced | businesses | tech | financial | remain | ethics | to change | observed | green

Many publications recognize the importance of the entrepreneur in the process of Internationalization. International Entrepreneurship (IE) was defined by (Oviatt & McDougall, 2005) as "*the discovery, enactment, evaluation, and exploitation of opportunities across national borders to create future goods and services*" and the second school of thought assumes that Entrepreneurial Orientation (EO) is more related with Corporate Entrepreneurship than with SMEs (Covin, Miller, 2014).

3.3. Keywords analysis with Endnote

The second part of this research had the objective of contrasting and finding connections with MALLET analysis. The study was performed using the subject bibliography tool of Endnote® X9. Table 1 shows the ten most common keywords and their relationship with specific topics. Performance, Internationalization, and SMEs are the most interrelated terms, which is congruent with the research since all papers in the cluster are part of the original web search and validate the topic modeling obtained from MALLET that all topics should be related to that theme.

Table 1. The most intertwined keywords or phrases related to the field

Keyword or phrase	Topic relationship	Repetitions
Performance	Export, Internationalization	49
Internationalization	SMEs, Resource-Based View (RBV), Barriers, Challenges	39
SMEs	Export, Internationalization, Performance, Entrepreneurship, born global firms, foreign markets, developing countries	37
Innovation	Entrepreneurship, Research and Development (R&D) SMEs, Export strategy, Dynamic capabilities	30
Export Performance	Internationalization, Competitive Strategies, Entrepreneurship, Marketing strategies, SMEs, Innovation, Determinants	24
Knowledge	SMEs, Export performance, Management skills, Motivation, Learning, RBV, Intangible assets	21
Emerging Economies	Latin America, China, Internationalization, Exports, Innovation, Dynamic capabilities, Strategy	20
Dynamic capabilities	Knowledge management, SMEs, Innovation, Internationalization, Export behavior, International ambidexterity	18
Resourced-Based View	Internationalization, Pillars, Global Entrepreneurship Monitor (GEM), Entrepreneurship, International ambidexterity, Competitive Performance, Exporting literature	18
Perspective	Internationalization, SMEs, Exporting, Foreign markets, Innovation, International Networks	15
Firm Performance	Dynamic capabilities, Export, Internationalization, Entrepreneurship, Manager Orientation, Social Networks, Information and Communication Technologies	12
Competitive Advantage	SMEs, Exports, Dynamic Capabilities, Innovation, Export Barriers, Capabilities and strategy, Government policies	11

Own source. Developed using of *Subject bibliography* of Endnote® X9 (Analytics, 2021).

Some other frequent keywords were: Entrepreneurial orientation, Strategy, Ambidexterity, Firms Capabilities, R&D, International Entrepreneurship, Foreign direct investment, determinants to export, Internationalization process, Absorptive-capacity,

Impact, Market Orientation, Market Entry, Networks, accelerated internationalization, Born Global, Latin America, Corporate Governance, among many more.

The keywords Performance, Internationalization, and SMEs are widely used, and this result was expected since all documents of the sample (857) were on this topic. The keywords Innovation, Export performance, and Knowledge are gaining more traction in the last decade to explain the Internationalization process.

Likewise, it was remarkable to find in the analysis, similarities with MALLET in phrases like Emerging Economies, Ambidexterity, Dynamic Capabilities, and Resource-Based View. Such terms might have become more popular among researchers on Internationalization. Future research might find them a fertile field to consider. Figure 1 shows a graphical interpretation of the most common words and their association with the main topics found in MALLET.

Figure 1. Relationship of popular keywords and topic analysis

Own source using data from (Analytics, 2021).

4. CONCLUSION

The objective of this paper was to find new trends in the literature using machine learning (MALLET) and reference management system (Endnote®) within the theme of the Internationalization of SMEs.

Importantly, several topics of research interest in the field are standing out: Resources-based Theory, Dynamics Capabilities, and Ambidexterity soon will be taken into consideration and thrive for researchers.

The systems produced insightful results; however, both approaches have room for improvement. MALLET's findings are somehow circumstantial, because the interpretations of the clusters of words may change depending on the person who analyzes them. It is recommended to use experts in the field to read and translate the outcomes into meaningful information. MALLET needs to improve its graphics interphase to be more user-friendly and introduce visual graphics. Endnote® seems to have a higher level of sophistication, but the price of the tool is its disadvantage, besides, it works better with papers in its journal's database. Even though some researchers and librarians find Endnote® as a great resource for academic research, especially for systematic reviews (Gotschall, 2021). There are some disadvantages. For first-time users the software is not intuitive, it requires hours of practice and sometimes technical support. All in all, this research phase might get easier with the use of knowledge management software.

To conclude, both, open-source and paid software produce comparable results. Hence, researchers should be encouraged to use machine learning and similar tools to improve their work.

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CONSPIRACY THEORIES AS AN EXAMPLE OF DISINFORMATION IN THE NETWORK

Conspiracy theories have been with people since their inception. The tendency to conspiracy thinking is related to many human cognitive mechanisms that greatly affect our perception of reality. Drastic and sudden events, especially those taking place on the international arena, are an impulse to plot intrigues in order to explain them and understand their causes. Anxiety and fear caused by uncertainty and a low level of trust, both in politicians and experts, are responsible for attempts to question the socio-political order and generally accepted explanations. The aim of the article was to present the phenomenon of spreading disinformation in the form of conspiracy theories on the Internet. The research problem was the question of which societies believe the most in the truth of selected conspiracy theories. The research methods used were: literature analysis. Diagnostic survey, the techniques were: text analysis and a survey with a questionnaire.

Keywords: disinformation, fake news, conspiracy theories.

1. THE MECHANISM OF THE FORMATION OF CONSPIRACY THEORIES

Researchers have found that some cognitive (epistemic) beliefs can explain belief in conspiracy narratives. Cognitive beliefs are a person's individual ideas about knowledge and its acquisition. For example, some people rely primarily on their intuition (which may not be a problem at first), but are not very interested in backing up their hunches with solid evidence. According to Jan Philipp Rudloff, assistant professor at the Department of Psychology of Communication and New Media at the University of Wuerzburg, who conducted the research in 2022. He and his colleagues wanted to find out what cognitive beliefs people believed in conspiracy theories about the coronavirus pandemic had. For this reason, they surveyed over 2,000 people, people from Germany and the USA. They noted that opinions have essentially the same value, regardless of the scientific evidence, which may support one thesis much more strongly than the other. In the study we can read

> Those who place a high value on their intuition and little on solid evidence, and who believe that what counts as truth is predetermined by those in power, are especially susceptible to fake news and conspiracy theories (*Dlaczego wierzymy w teorie spiskowe*?, https://thefad.pl/aktualnosci/teorie-spiskowe-2/).

The study also answered the question: do people with pronounced “dark personality traits” have a greater tendency to the cognitive beliefs described by Philipp Rudloff, and

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therefore to believe in conspiracy theories and fake news? Thus, our tendencies and susceptibility to believe in theories conspiracy is influenced by our personality and knowledge.

People with strong narcissistic features like to be in the center of attention, people with a clearly outlined Machiavellianism attach particular importance to status and power. Psychopathy, on the other hand, is characterized by risk-taking and excessive impulsiveness. The more important the dark personality factor is, the more likely someone is to believe conspiracy narratives, explains the study. The scientist was not surprised by this discovery, because it was rather predictable. These types of people have a greater aversion to pro-social behavior, which is not primarily about their own benefit and gaining an advantage. Keeping a distance, wearing a mask or staying at home does not seem to be necessary with the appropriate cognitive beliefs.

The importance of appropriate cognitive beliefs may explain why the very content of conspiracy theories is so easily replaceable. The pandemic, the war in Ukraine, and the climate crisis can serve as their basis. Cognitive beliefs develop in childhood. In this way, the difference between opinion and fact could be explained in school lessons using accessible language. The lack of knowledge in some people makes them unwilling to accept it. For them, every opinion is worth the same. Research, however, shows that this problem affects a minority. Most people care about evidence and understand the difference between opinions and facts (*Dlaczego wierzymy w teorie spiskowe?,* https://thefad.pl/aktualnosci/teorie-spiskowe-2/). Conspiracy theories and fake news accompany big, new, often shocking events that act as a trigger for us. In this case, it is a pandemic, previously it was, for example, the death of Princess Diana.

When abstract news reaches us, some begin to wonder if it is not the so-called. conspiracy of the mighty of this world. The problem is the so-called information bubbles we live in. Algorithms give us the information that interests us most. Those who believe in conspiracy theories will be suggested just such content (*Dlaczego wierzymy w teorie spiskowe?,* https://www.polskieradio.pl/10/5367/Artykul/2501465,Dlaczego-wierzymy-w-teorie-spiskowe).

2. BADANIA YOUGOV-CAMBRIDGE GLOBALISM PROJECT

Research conducted by the YouGov-Cambridge Globalism Project, involving more than 25,000 people in 24 countries, looked at different attitudes towards conspiracy theories in different parts of the world. The total sample size was: France=1085; Germany = 1009; Sweden = 1038; Denmark = 1170; Spain = 1035; Italy = 1023; Greece = 1045; Hungary=1012; Poland = 1035; UK = 1062; Australia = 1076; US = 1004; Canada = 1127; Brazil = 1117; Mexico = 1092; Turkey = 1041; Egypt* = 1009; Saudi Arabia = 1005; Russia = 1228; India = 1212; China = 1026; Japan = 1155; Indonesia = 1473; Thailand = 1004; Kenya = 1017; Nigeria = 1057; South Africa = 1159. Field work was undertaken from August 4 – September 21, 2021. Surveys were conducted online. For markets marked with *, figures have been weighted and are representative of the 18+ online adult population. For other markets, figures have been weighted and are representative of the 18+ adult population. There is a margin of error due to different sample sizes and different response distributions. For a sample of 1000 it is +/- 3% with a confidence level of 95%. When reporting results for subgroups, the margin of error will be higher than for the entire sample,

for example up to +/- 6% for 300 subgroups. The study asked questions about the authenticity of the events depicted.

Here is a list of questions and answers that outlines the most and least credible conspiracy theories, and lists the countries most and least likely to believe in them.

2.1. A single group of people who secretly control events and rule the world together, outside of official rule.

The theory that a single group of people who secretly control events and rule the world together, outside of official governments, had the highest average level of belief in all 24 countries out of a list of 12 popular conspiracy theories. The greatest support for this theory was particularly widespread in Kenya, Nigeria and South Africa, with 72%, 69% and 61% respectively. Another 17% of Kenyans, 22% of Nigerians and 27% of South Africans said they did not know about it: it could be true or it could be false (Figure 1) (https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b).

Figure 1. Which conspiracies do people around the world believe in?

Source: https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b za https://docs.cdn.yougov.com/5pth7rkugw/YouGov%20Cambridge%20-%20Globalism%202021%20-%20OMGLOB131%20CONSPIRACY%20THEORIES.pdf

2.2. Donald Trump conspired with the Russian government in 2016

The theory that members of former US President Donald Trump's campaign team knowingly collaborated with the Russian government to help him win the 2016 US election came second on the list. The highest support for this theory was in Kenya. In countries that are generally more skeptical of other conspiracy theories, such as the UK, Sweden, Germany and France, and Denmark, people are less likely to believe that President Joe Biden stole the 2020 Donald Trump election by committing a systemic electoral fraud. This belief is highest in India, where 39% of the population say it is definitely or probably true, in Russia (37%), South Africa (33%) and America (33%) (Figure 2) (https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b).

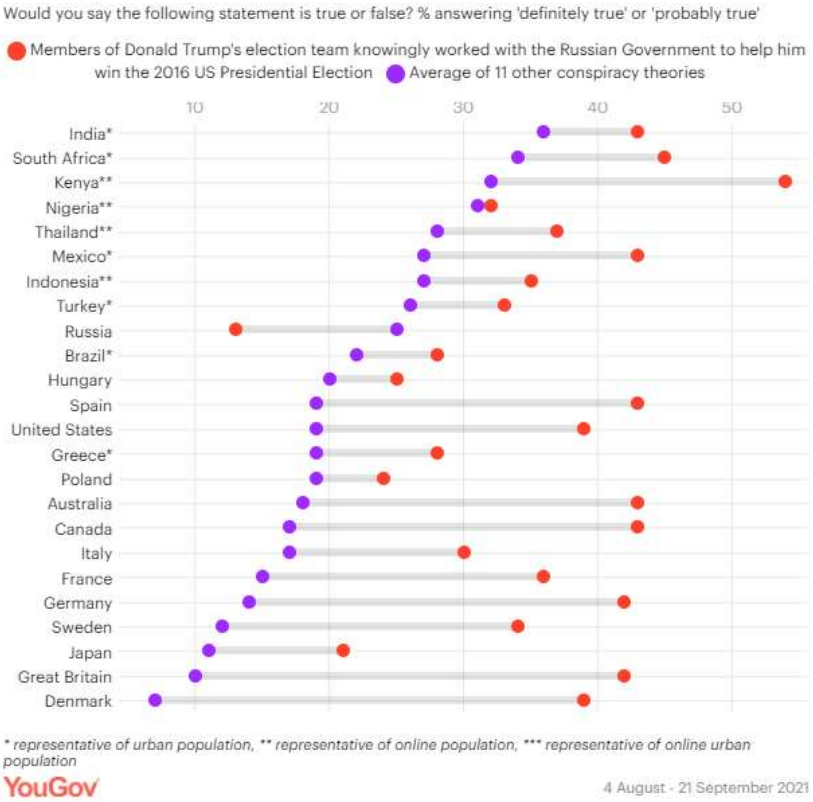

Figure 2. Countries that have lower average levels of belief in other conspiracy theories are more likely to believe that Donald Trump colluded with the Russian government to win the 2016 US presidential election

Source: https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b za https://docs.cdn.yougov.com/5pth7rkugw/YouGov%20Cambridge%20-%20Globalism%202021%20-%20OMGLOB131%20CONSPIRACY%20THEORIES.pdf

2.3. The Vaccine Myth

The vaccine myth has a high average support compared to other conspiracy theories. When it comes to the average level of belief in the 24 countries surveyed, the myth that the truth about the harmful effects of vaccines is deliberately hidden from the public ranks third on the list. Belief in this theory is highest in Kenya, Nigeria and South Africa (54%, 50% and 59% respectively say it is definitely or probably true) and lowest in Sweden, UK and Denmark (15% respectively, 13% and 10%).

In turn, the myth that the coronavirus is created by powerful people and that the virus does not really exist is the least credible message. Belief in this theory was highest in India, where 30% of Indians said they believed it definitely or probably true, and lowest in Japan (4%), Denmark (4%) and the UK (3%) (Figure 3) (https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b).

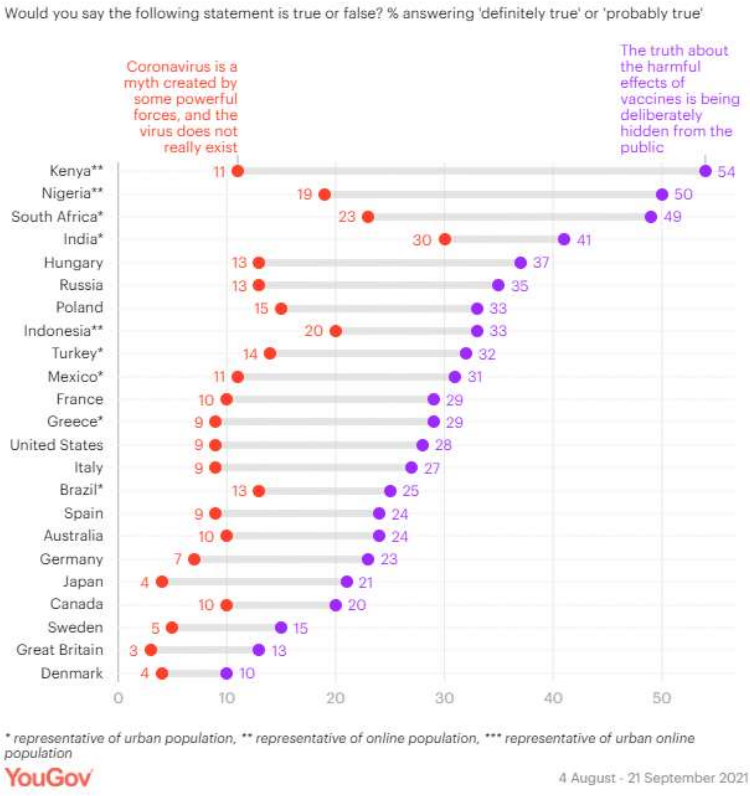

Figure. 3. In all countries, vaccine scepticism does not go hand-in-hand with believing the coronavirus is not real

Source: https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b za https://docs.cdn.yougov.com/5pth7rkugw/YouGov%20Cambridge%20-%20Globalism%202021%20-%20OMGLOB131%20CONSPIRACY%20THEORIES.pdf

2.4. Opinion on countries with the highest and lowest levels of belief in conspiracy theories

Of all the 24 countries surveyed, India had the highest average percentage of people responding "definitely or probably true" to the 12 conspiracy theories surveyed. The level of support for each individual theory ranged from a quarter (26%) who believe the 1969 moon landings were faked to a half (50%) who believe one group of people secretly rules the world together. South Africa, Kenya and Nigeria had high average support for conspiracy theories, but this is largely due to the high level of belief in the group of people who secretly collectively rule the world, mentioned above. The Danes had the lowest

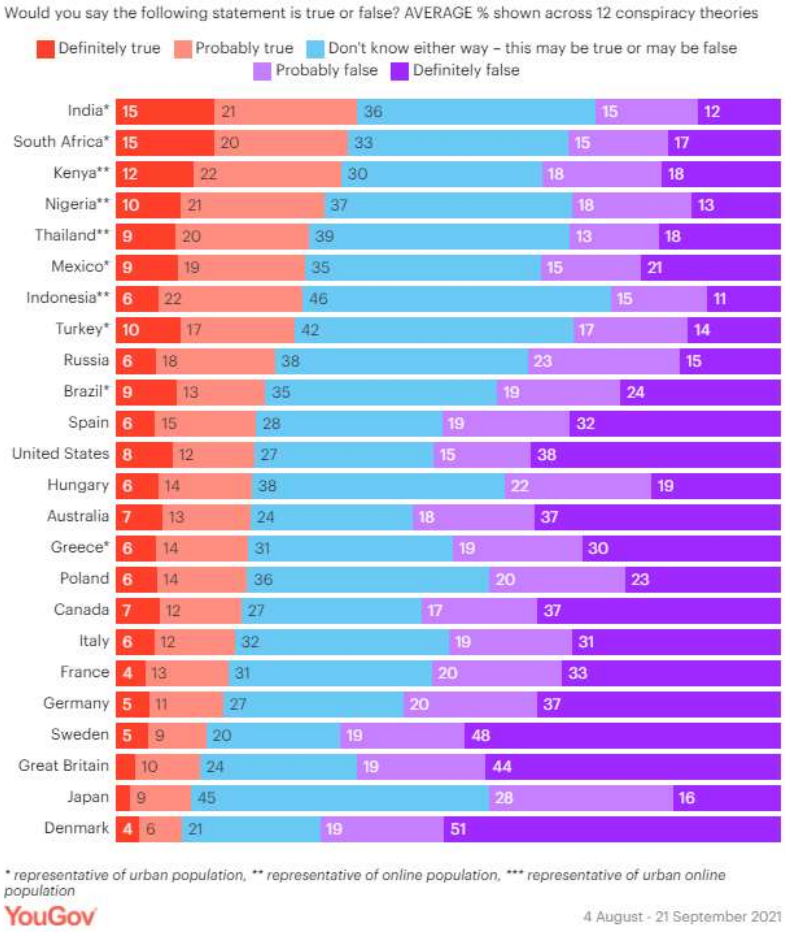

Figure 4. Out of 24 countries across the world, India has the highest average belief in 12 popular conspiracy theories - followed closely by South Africa and Kenya

Source: https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b za https://docs.cdn.yougov.com/5pth7rkugw/YouGov%20Cambridge%20-%20Globalism%202021%20-%20OMGLOB131%20CONSPIRACY%20THEORIES.pdf

percentage of people answering "definitely or probably true". Japan also had a very low average level of support for conspiracy theories, although this did not translate to more Japanese people claiming that conspiracy theories are definitely or probably false. In fact, Japan ranked second behind Indonesia in countries where a high average percentage of people responded "I don't know any way – it could be true or it could be false" to conspiracy theories (Figure 4) (https://yougov.co.uk/topics/international/articles-reports/2022/02/08/what-conspiracy-theories-did-people-around-world-b).

3. CONCLUSIONS

The multitude of conspiracy theories functioning around the world can amaze. They appear with every significant event, such as a high-profile assassination attempt, a catastrophe, or the death of a famous person. Stories of secret societies and global conspiracies ignite the imagination of millions of people. Along with those quite probable, there are also completely absurd ones.

They have been functioning for years, but never before has their dissemination been as easy as now. This is closely related to the universality of access to information, i.e. mainly to the creation of the Internet. Now everyone can become a blogger, influencer or publicist, and thanks to their reach on Instagram, Facebook, You Tube or Twitter, they can reach an unlimited number of people.

Some conspiracy theories arise spontaneously as an attempt to regain control over the surrounding world. They make us feel powerless. It is easier to create your own truth than to move in a chaotic, amorphous space, being what truth is. Then you have complete control, you can't make a mistake, you can't be right. There is no need to analyze other points of view, motivation, because there are none. Unfortunately, some of this will sound like a conspiracy theory, it is itself a form of conspiracy. When people are fighting with each other, society is polarized because someone has cleverly set several groups against each other, they are easier to control because they are unable to unite.

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https://demagog.org.pl/analizy_i_raporty/sposob-na-teorie-spiskowa-co-prowadzi-do-myslenia-konspiracyjnego

https://docs.cdn.yougov.com/5pth7rkugw/YouGov%20Cambridge%20-%20Globalism%202021%20-%20OMGLOB131%20CONSPIRACY%20THEORIES.pdf

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SUPPLY CHAIN MANAGEMENT PROCESS IN ENTERPRISES OF THE AGRI-FOOD INDUSTRY IN PODKARPACIE

One of the elements of creating a competitive advantage of modern enterprises is the development of supply chains, in which logistic processes are essential. Managing such a supply chain allows the integration of key business processes from the end user through suppliers delivering products, services and information, which provides added value for customers and other stakeholders.

The main purpose of the study is to assess the degree of implementation of logistic business processes within the supply chain in enterprises operating in the agri-food industry. The source material on the basis of which the analysis was carried out and conclusions were formulated were surveys conducted among agribusiness entrepreneurs from Podkarpacie.

The conducted research shows that the level of advancement of logistics processes in supply chains depends on the type of industry in which a specific company operates and its size. Larger economic entities, due to the possibilities and capital they have, use advanced and integrated IT systems supporting production planning, supply, distribution and sales. The implementation of such tools allows for the standardization of many business processes within the network of connections of entities participating in a common supply chain.

Keywords: supply chain management, partnership in the supply chain, business process integration, agribusiness.

1. INTRODUCTION

One of the characteristic features of modern economies lies in the numerous transfers of goods and information. The subject literature indicates two basic types of flows of goods and information – between the entities acting and competing in the same industry, as well as between the related entities, in which one of them acts as a supplier, and the other one acts as a recipient of goods and services. The great importance in this case belongs to the

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flow of goods and services between the subsidiaries. It is de facto a classic example of the simplest supply chain (Kiełbasa, 2015). The supply chain is a long-term and continuous contractual relationship established by enterprises with independent decision-making power to achieve strategic goals (Gu, Yu, 2022).

The network of logistic connections is not only focused on transfers within a single chain, but it also includes a network of complex flows resulting from the implementation of different customer orders and the need of their simultaneous processing. Within these complex flows, the activity of a specific entity may focus only on a specific segment or link in the supply chain. An example of this connection is a downstream supply chain – the companies are positioned in this system as customers of their customers. On the other hand, in the upstream supply chain – they are perceived as suppliers of their suppliers (Ciesielski, 2011).

The supply chain management process, as one of the critical components of logistics, focuses on ensuring the source of raw materials, organizing suppliers, shaping the policy and rules for purchasing, as well as on collection and transportation of raw materials within the enterprise; this process also includes warehousing and storage of final products, as well as distribution, storage and transportation to distribution centers (Piocha, Dyczkowska, 2012). Taking into account the above components of the logistics process, the supply chain can be described as an „activity focused on optimal provision of services and products flow, starting from the raw components to final products in which the goods and services produced are purchased and consumed by the final recipient. In this context, logistics allows for the integration and comprehensive management of such areas of a company as: planning and proper production, financial accounting or sales and distribution (Polak, Tokarski, 1996). The aim of any agri-food supply chain is to achieve a full and effective flow of goods, services and information, transferring capital to create and provide maximum customer value. (Dinu, 2016).

The food processing and supply chain is characterized by a wide variety of entities involved in it. It includes not only producers, suppliers, transport companies, but it also includes wholesalers and retailers, producer and consumer organizations. Due to connections and relations with the suppliers, these entrepreneurs create a network of organizations involved in various processes and activities; they create value in the form of products and services which are provided to the final consumers.

Focusing on supply chains development by many companies is conducive to increase in the efficiency of customer service, decrease in operating costs and provision of permanent access to the strategic raw materials (Christopher, 2000). Proper organizing and optimization of key areas supply chain management constitute nowadays an indispensable element of the developed and implemented corporate strategies. Properly configured supply chain with particular reference to the specificity of the company's production is an important factor in gaining and maintaining a competitive advantage in business environment by influencing costs, quality, strategic inventory level, delivery method and the bid (Witkowski, 1998). The competitive advantage is favored by the very structure of the supply chain, in the light of which the individual organizational units of connections network are not individually responsible for the competitiveness of their products and services, but this responsibility lie with the supply chain as a whole. The aim of the research is to assess the level of advancement in the implementation of supply chains in logistics processes in selected enterprises operating in the agri-food industry.

2. THE SPECIFICITY OF AGRI-FOOD PROCESSING SECTOR

One of the essential areas of broadly understood agribusiness is precisely the agri-food sector. The main task of this sector of food economy is proper protection or processing of perishable plant and animal raw materials into products that are more shelf-stable or that are ready for immediate consumption. Agricultural supply chain management is becoming a very important area of research due to the challenges of changing seasonality, supply and demand peaks and delivery fulfillment (Wicaksono, Bálint Illés, 2022). The relationship between the agri-food sector and agriculture is one of the basic criteria for assessing the level of development and modernity of agribusiness (Urban, 1998). Depending on the applied technological processes and processing industries, the products of this sector may be pre-processed goods or final goods which are ready for direct consumption (Szczepanowski, 2020).

Due to significant technical disproportions, spatial diversification of agriculture and historical events, the national agri-food sector is highly diversified at the regional level. The development of agriculture, the amount of yields obtained from this sector of economy is determined by natural conditions, as well as by organizational and economic factors. These dependencies have a significant influence on the level of the resources usage, competitiveness of agriculture and its place in the economy of a certain voivodeship.

The agri-food industry itself concentrates several key economic areas that deal with various activities at the crossways of agriculture, processing and food distribution. It is indicated in the subject literature that this sector includes three constituent areas: a primary area – covering agricultural production, food processing and trade, as well as food consumption; the auxiliary and service areas (Kiełbasa, 2015).

The dynamic changes in Polish agriculture resulted in its significant modernization, due to which the agri-food industry has become one of the leading and rapidly growing sectors of the national economy. Due to significant funding streams to the agri-food sector, it was possible to increase its modernity and competitiveness. Organizational and technical changes have significantly impacted production capabilities. As a result, export of agri-food products and foreign trade balance have increased. Within a few years, Poland has become a leading European producer and exporter of high-quality food products. Further development of agri-food industry is closely connected and dependent on the environment, use of potential opportunities and ability to implement new technologies. The above mentioned factors have a significant influence on further development of this sector, maintaining a competitive environment, both on the national and international market (Świadek, 2013).

The main factor in the formation of the supply chain in agri-food industry is a need to reduce the costs of its operation. However, this reduction does not concern, as in the case of other industries, costs of transport or forwarding, or limiting the amount of stored reserve stocks. The specificity of agri-food processing obliges their participants to adjust their infrastructure in such a way that they could effectively participate in the flow of goods.

3. RESEARCH AND METHODOLOGY

The main source of research material was individual survey research. The main research method used under the research project was the quantitative method of one-time diagnostic survey method. The choice of this method was caused first of all, by nature of the research environment and the specificity of the agri-food processing industry. However, in order to

obtain interesting empirical material, the survey research technique was used. The research tool enabling the implementation of the adopted technique is a survey questionnaire.

The survey questionnaire consisted of two parts. The first part contained questions relating to the size of the enterprise, place of operation (company seat) and the legal form of the enterprise. The second part included questions with regard to the formulated research objective. The survey questionnaire included 10 questions in electronic form which were sent to the entities agreeing to participate in the survey. The research was carried out from 4 to 30 April, 2022 among the entrepreneurs of the town located in the Podkarpackie Province. The research was carried out regardless of the size of enterprise and its legal form. The criteria for assessing the size of the enterprise were the guidelines and recommendations of the European Commission of May 6, 2003 concerning the definition of micro, small and medium-sized enterprises (Journal of Laws UE L 124 of May 20, 2003, p. 36).

The entities participating in the study got 270 survey links with the access to the survey questionnaire, and it was received back 178 links which constituted 65.9% of all business entities selected for the study. During the selection, it was observed that all the participants of the research completed correctly the questionnaire. The research results were then analyzed, discussed and presented graphically.

The most numerous group of entities participating in the study were representatives of small business sector (69.3%), as well as representatives of micro-enterprises, who constituted 17% of the research. Subsequently, the mid-sized enterprises (15.3%) and large-sized enterprises (4%) were involved in the research. In the course of the analysis, it was found that the vast majority of entities participating in the study (74) were the entrepreneurs involved in meat slaughtering and processing. The second group included the entrepreneurs operating in the milk and grain processing industry (35 and 27 respectively). The last group was represented by the entrepreneurs whose main activity profile was fruit and vegetable processing (42).

4. RESEARCH RESULTS

Each entity operating in the processing is linked by dependencies and relations with the closer and more distant business environment. Most agri-food players in emerging and developing economies are characterized by small and medium-sized suppliers that are heavily dependent on much larger buyers and leading companies (Glavee-Geo, Engelseth, Buvik, 2022). When organizing and managing supply chains with business partners, one should seek maximum reduction of this chain length by limiting the number of intermediaries participating in this process. The exclusion of the unnecessary entities allows for a more efficient delivery of the product to the recipient, it favors better quality of the food (reduction of repackaging and storage), the competitive price of the product and allows the producer to achieve a greater profit from the production and sale of the product (Tundys, 2015).

The achievement of the above objectives lies in the usage of such a model of supply chain management that would allow for deeper integration of business processes between partners, or for more efficient coordination of the materials flow, information and finances between the participants of the chain (Lee, 1998). Overcoming organizational barriers, adjusting strategies and accelerating flows along the supply chain allows to guarantee optimal results of cooperation between the entities involved.

The analysis of organizing and management of the supply chain of the surveyed entities was carried out in relation to seven fundamental, and at the same time, critical economic processes taking place in each production and trade company: customers and suppliers relationship management, the communication with cooperators management, as well as customer service measurement, production planning, implementation of orders and production flow management.

Customer relationship management is a process in which a business or other organization administers its interactions with customers. The recipients' identification allows you to define the key customers, a group of target customers, and divide them according to the criterion of value over time, as well as linking customers with the enterprise by offering customized products and services (Lambert, 2001). The customer structure analysis based on the industry criterion indicates that the main clients of meat processing enterprises are retail entities (small shops), while the dairy entities, as well as fruit and vegetable industries are usually food wholesalers and large-scale retail chains. In general, the most frequent clients of agribusiness enterprises, regardless of the sector, are usually wholesalers (Chart 1).

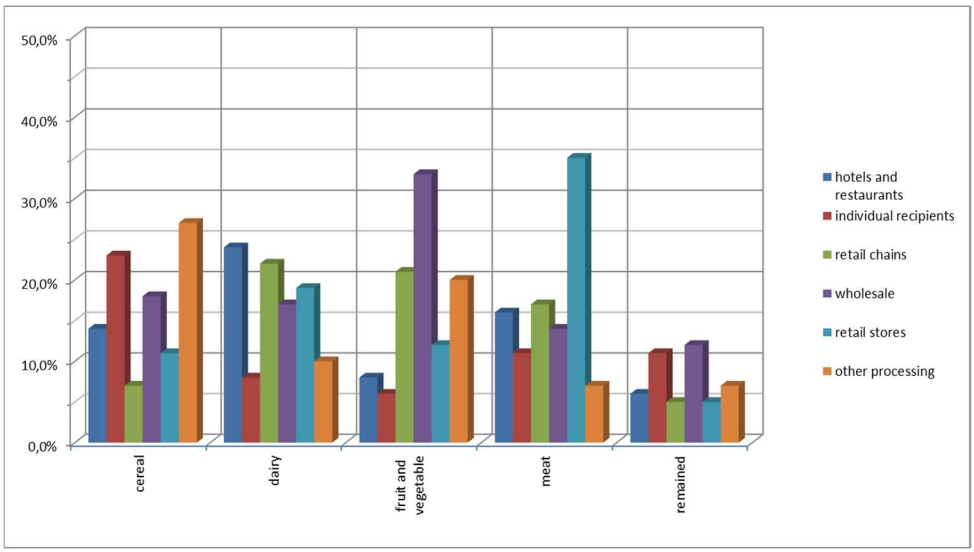

Chart 1. The structure of clients according to area of economic activity

Source: own study.

In the course of the analysis, certain regularities were found in the surveyed companies, where market penetration of supplies and sales were taken into account. The increase in the production of enterprises influence proportionally the expansion of their impact on the supply and sales markets. Small economic entities thus, usually included in the group of micro and small enterprises, try to function by supplying the local market. The geographic scope of market penetration transfers to regional markets with the increase in the size of the company, and in case of large enterprises, respectively – to national and international markets.

Within the suppliers relationship management, the activity of enterprises focuses on defining the scope of cooperation with suppliers, as well as on conducting negotiations with each key supplier with regard to products and service agreements. The developed practice of the surveyed companies indicates that the terms and principles of cooperation are not negotiated in relation to non-critical suppliers. The relations and principles of long-term cooperation are however determined on the basis of bilateral agreements, concluded between the entrepreneur and strategic supplier. Regardless of the nature of cooperation in the supply chain, the main goal of shaping the relations between the entrepreneur and the supplier is to achieve mutual business benefits. The structure of suppliers for enterprises operating in the agri-food processing sector indicates that mainly entities purchasing raw meat and dairy products are of strategic importance, and in case of the grain industry - agricultural enterprises. On the other hand, the suppliers of fruit and vegetable raw materials are usually individual farmers and purchasers (Chart 2).

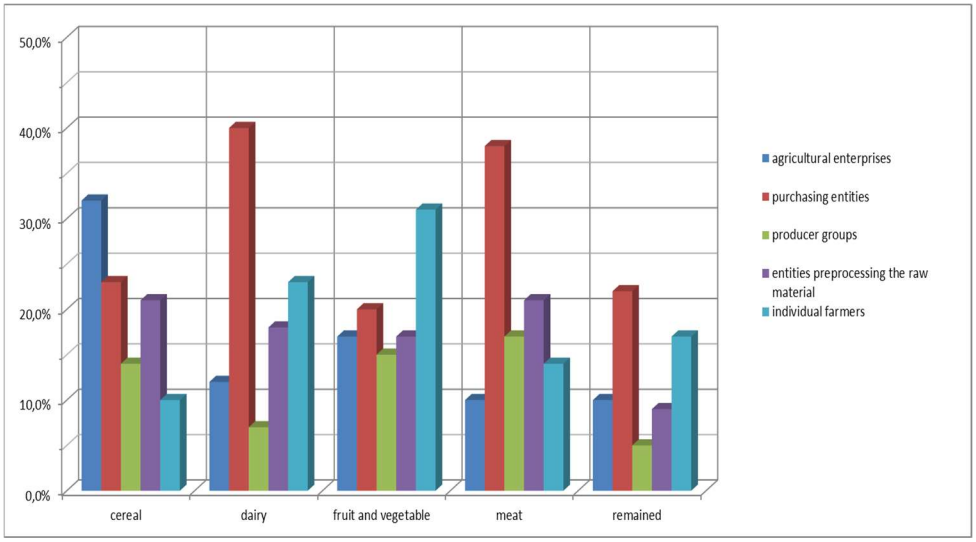

Chart 2. The structure of suppliers according to area of economic activity

Source: own study.

An important element determining the quality of relations between customers and suppliers is the information transfer. This communication is particularly important especially in food supply chains, because of the necessity for product tracking and tracing. Traceability of food origin, feeding stuffs, farm animals and food additives at all stages of production, processing and distribution is one of the elements of its subsequent certification.

Technological changes and consequently provision of market solutions with electronic communication cause that nowadays more and more companies are just beginning to get away from the traditional communication scheme. Extension of supply chains, hire of subcontractors and increasingly common outsourcing have caused the necessity to improve communication and data flow system between employees, departments of the same company, as well as between the clients and suppliers cooperating with it. These changes

concern almost all the entrepreneurs, although due to the specificity of the agribusiness sector, these processes take place relatively slowly.

According to the surveyed entrepreneurs, as a matter of principle, the flow of information with close business environment (the recipients and suppliers) is based on conventional solutions. For this purpose, telephones, e-mail and faxes are commonly used. It is noticeable that with a company development, conventional methods become more and more unreliable, ineffective and hinder the company's development. Therefore, an increasing number of entities, especially those with more capital and aspiring to expand their business impact decide to use modern electronic techniques. The research show that more and more large enterprises operating in the agri-food industry from Podkarpackie region make decisions and urge its partners to implement solutions relating to the usage of electronic platforms for the exchange of documents and transactions between companies. Electronic Data Interchange (EDI) technology enables cooperating entities to exchange business documents and send them in a standardized format which connects them within the supply chain practically all over the world. On the other hand, small enterprises, especially the ones, belonging to micro and small scale enterprises, mostly use verbal communication or paper document flow with recipients and suppliers (Chart 3).

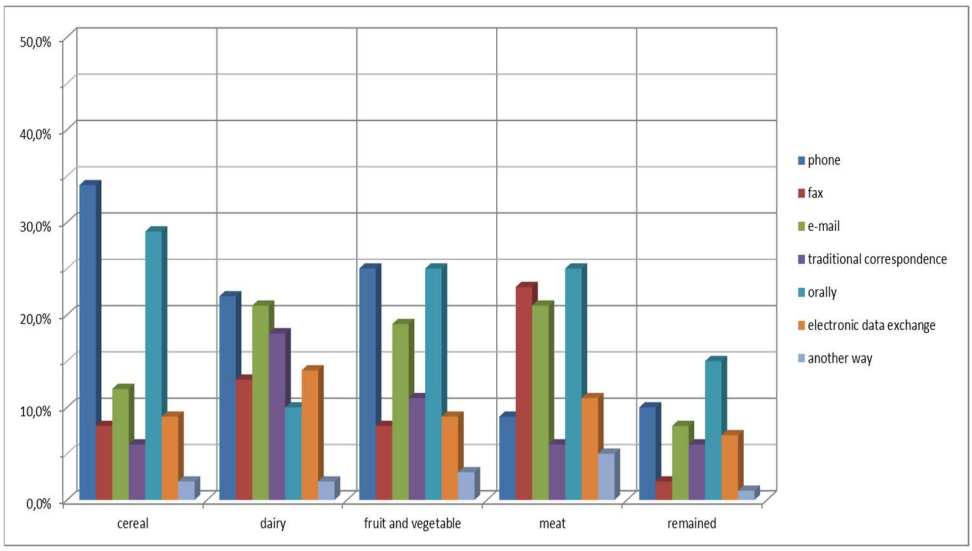

Chart 3. The way of communication with main partners

Source: own study.

One of the key elements of business operations is customer service management, which allows the companies to maintain their existing customer base and gain new customers.

Within this area, an extremely important issue is measurement of customer service effectiveness. There is no single, universal pattern of effectiveness, that is why many companies define and monitor it themselves. A well-developed supply chain metrics system can increase the chances of achieving market success. A company can achieve it by adjusting certain logistic processes within a group of cooperating entities, by directing its

activities to the most profitable sectors of the market, or by differentiating products or reducing their costs. On the other hand, an inappropriate system of measures leads to difficulties in meeting the needs and expectations of consumers, causes competition in the supply chain and the apparent optimization of the company performance (Lambert, 2008).

In order to exclude the above negative factors, it is necessary to implement the solutions regarding the development of supply chain measures, taking into account not only the prospect of increasing profits, but above all, the improvement of managing relations with customers and suppliers in every link of the supply chain. The symbiosis of these expectations can form the basis for creating a system of measures to identify opportunities for improvement of profitability and goals coordination among all actors in the existing supply chain.

For the purposes of this research, the measurement of customer service level was made on the basis of three basic criteria: timeliness of order fulfillment, availability of the ordered goods from the available stock and correctness of order fulfillment (on time and in the expected quantity, in the right place and without damage). The analysis of the research in this matter confirms that nearly 40% of the surveyed enterprises, regardless of the industry, are entities that have never measured the level of customer service. A detailed analysis of this issue showed that the enterprises with a relatively low development potential and the ones included in the sector of micro and small enterprises have a dominant share in it. The awareness of customer satisfaction importance and the level of customer service are significantly increasing in the medium and large enterprises, where more attention is paid to monitoring the level of customer service and customer satisfaction with the existing cooperation. This approach is used in the results of the research, according to which the time or correctness of order fulfillment are criteria that are appreciated by many customers (Chart 4).

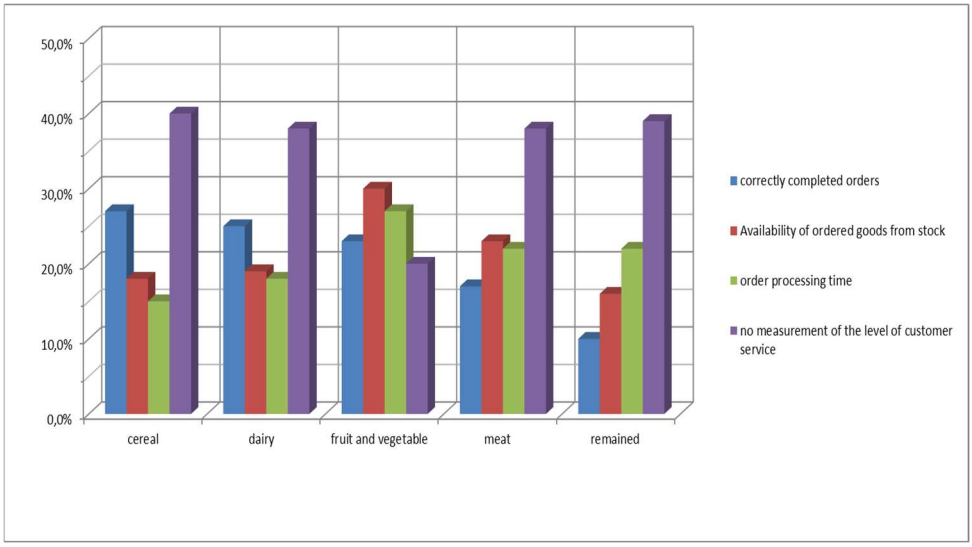

Chart 4. Criteria for measurement of customer service level

Source: own study.

Demand management is one of the elements of supply chain management, which integrates the requirements and needs of customers and suppliers with the capabilities of individual links in the supply chain. Due to control of supply volume in relation to demand volume, the company can dynamically respond to the implementation of the assumed production plans. Effective process management allows the company not only to forecast the production volume, but also enables the synchronization of supply and demand, and thus to increase appropriately the flexibility, as well as to reduce the demand volatility. In case of expected demand, a well-structured demand management process can lead to greater activity of the company and more effective responses to the unexpected changes in demand.

The production planning process of the surveyed entities is generally based on the number of incoming orders. This type of demand management usually applies to micro and small enterprises, which as a rule, avoid production of goods for stock. On the other hand, the representatives of medium and large enterprises, while determining the volume of production, take into consideration the number of incoming orders and use their own analysis based on the market forecasts, own and archival data (Chart 5).

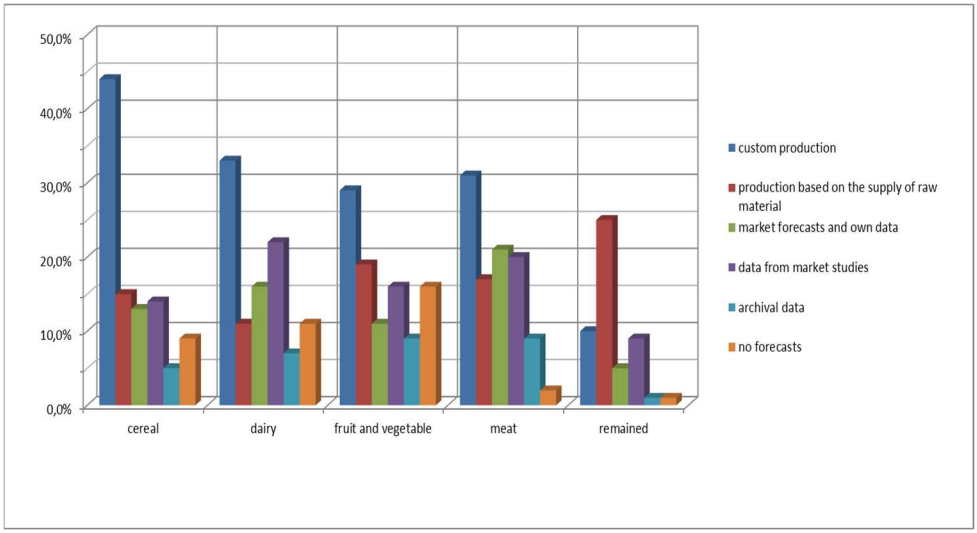

Chart 5. Data sources determining the volume of production planning

Source: own study.

The order fulfillment process is a set of activities and actions aimed at identification and assessment of customers' requirements that allow the company to meet customers' requests, whilst minimizing the total costs of delivery and order fulfillment. This process is not only the implementation of typical logistic activities, but it requires an interdisciplinary action, that is involvement of other company departments in its implementation.

The subject literature indicates four main models of materials management for customer orders service (Baran, Wysokiński, Jałowiecki, 2011):

1) customer orders fulfillment based on the available ready-made goods,
2) production of ready-made goods for the warehouse, and then their packaging and sending after customer order receiving,

3) maintaining a constant level of semi-finished products and start of production upon receipt of customer orders,
4) purchase of production materials and start of production upon receipt of customer orders.

The analysis of the obtained research results confirms that the dominant model of order fulfillment in the surveyed enterprises is the customer orders processing from available warehouse stocks. The compilation of empirical data confirms that a large part of entrepreneurs also practice the "production to stock" model, and the final packaging of goods is upon receipt of customer order. The operation specificity of some agribusiness enterprises demands implementation of another method of order fulfillment – starting production on an ongoing basis with the use of production materials upon receipt of customer orders. This model is characteristic mainly of enterprises operating in the grain and dairy industries (Chart 6).

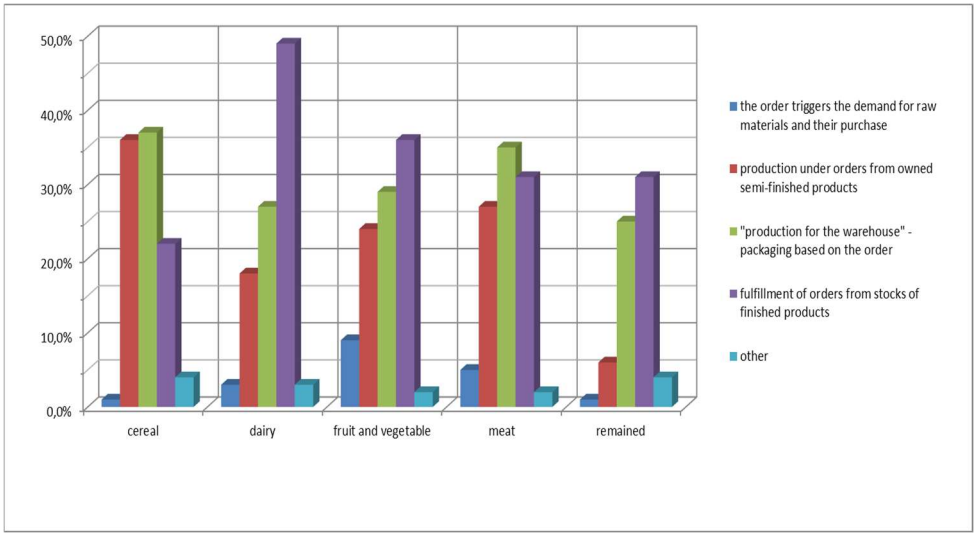

Chart 6. Methods of customer orders fulfilment

Source: own study.

It should be noted, however, that the company itself does not decide on the choice of order fulfillment. An important determinant defining its implementation is the specificity of production or the availability of agricultural raw materials. This problem concerns particularly dairy processing enterprises, which are not always freely decide on the amount of purchased raw material, because it is produced on an ongoing basis and its acceptance must be maintained in the same way. This problem is also encountered by enterprises dealing with fruit, vegetables and grain processing. In this case, decisions on shaping the amount of stocks are limited by their availability only in strictly defined periods of the year. The situation is different for those enterprises which production is based on partially processed raw materials (semi-finished products) and for the ones, which are at the end of the supply chain, that is wholesale and retail trade companies (Michalczyk, 2018).

Production flow management is a process in the supply chain management that concentrates all the activities concerning movement of products in the production process phase. This issue is connected with production flexibility in the supply chain, and thus, the ability of enterprises to produce a wide range of products at the right time and at the lowest possible costs. A certain level of flexibility requires the stages of production planning and implementation to be supported by IT systems that integrate the basic processes of the company operation (Klepacki, Wicki, 2015).

The research results indicate that all surveyed entrepreneurs use financial and accounting programs with various levels of technical advancement. As a rule, simple and distributed systems are used in micro and small enterprises, and their degree of economic events complexity is low. The enterprises, especially the ones relating to the medium-sized enterprises, and regardless of industry, use more advanced IT tools in their activities. The most frequently used in this sector of entrepreneurship include such IT tools as Comarch ERP Optima or Enova356, SAP Business One or Microsoft Dynamics 365 Business Central. The functionality of these programs allows for material and production resources management (MRP planning) and support in the enterprise resource management (ERP systems).

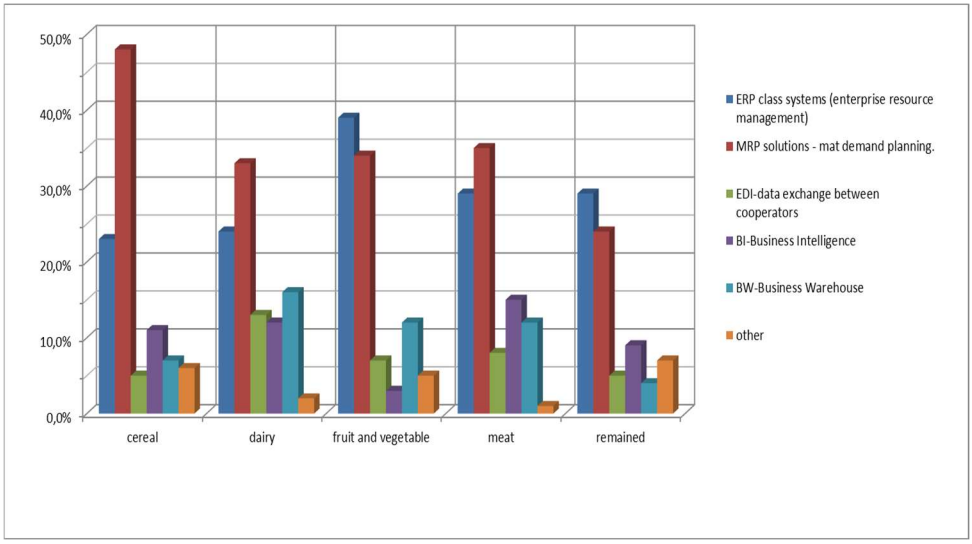

Chart 7. IT systems supporting the course of production processes

Source: own study.

A completely different production management strategy is inherent in large and some medium-sized enterprises. Most of them are based on the advanced IT systems that enable enterprise resource planning, supporting various departments of the enterprise (e.g. finance, production, human resources, supply chain, service or purchase departments) in the implementation of main processes within integrated system. The degree of production, logistics and supply management processes requires the use of more advanced IT solutions, such as SAP Business ByDesign, SAP ERP 6.0 or SAP S/4HANA. A relatively small

number of business entities under study, operating mainly in the meat and dairy industry have declared the use of decision support systems, that is IT tools that allow to conduct the advanced business analytics. It goes here about Business Intelligence and Data Warehousing used for processing and storage of information for strategic and analytical purposes.

When analyzing IT systems which support enterprise management, it is worth pointing out that a lot of medium-sized and large entities operating in the dairy and meat processing industry use electronic data interchange system – EDI (Electronic Data Interchange), especially in relations between the enterprise and the customer (electronic transfer of orders and invoices), as well as between the company and the supplier.

5. SUMMARY

In the modern economy, the implementation of supply chains and information flows, which operate effectively and efficiently, seems to be indispensable factors of cooperation between enterprises, both at a national and international level. The specificity of the agri-food industry requires the modern supply chains to be as simple as possible and withdraw from the market all intermediate links. The reflection of such requirements is the concept of short supply chains. The food supply chain which operates effectively and efficiently is an essential condition for its participants to be adapted to changing market conditions. The strategic importance of the delivery time of products results from the necessity to meet the needs and expectations of customers with regard to specific groups of products. This allows for certain benefits to be achieved by producers and suppliers of these products. Thus, a well-functioning supply chain should be perceived as a whole, and it allows to react effectively and efficiently in various situations.

The implementation degree assessment with regard to organizational and technical solutions in the logistics processes of enterprises, especially the supply chain, requires a series of analyses and tests. These analyses should cover not only the company's resources, market conditions, but they should also include its direct business environment, especially cooperating entrepreneurs – recipients and suppliers, methods of communication, as well as production and customer service management. The diagnosed needs require the subject studies that allow to characterize and assess the level of supply chains advancement in the course of logistics processes in selected agribusiness enterprises. Taking into account the conducted analyses and empirical material, it was possible to formulate the following conclusions:

1) The possibilities and resources of large agribusiness enterprises favour investment in the development of logistics processes, their integration with key recipients and suppliers, as well as implementation of modern IT tools supporting company management at all levels of its functioning. Micro and small enterprises have a limited potential in this respect, the scope of their operation usually covers the local market which rarely goes beyond the area of the Podkarpackie Voivodeship. Local market activity is also determined by the size of cooperators base, lack of perspective for investment in expensive tools supporting warehouse management, production planning or other logistic activities.
2) The advancement degree of economic processes and events in large and medium-sized agribusiness enterprises determines the need to invest in implementation of modern logistics management tools, and sometimes even in IT solutions that

integrate all departments of the company: production planning, procurement, materials management, sales and distribution, human resources management, as well as accounting and finances. Large entities competing on the national and international market usually have comprehensive and often standardized IT solutions that allow to integrate their logistics processes with an expanding base of cooperators.

3) Enterprises are constantly seeking ways of gaining, sustaining and increasing the competitive advantage. In this process, the concept of short supply chains plays an important role. It is significant in shaping and development of agri-food sector. The strategic importance is attributed to short time of the product delivery from its place of production (the primary link of the short supply chain) to the end customer (the final link in the chain). Research shows that more and more entities operating in agribusiness sector take measures to eliminate unnecessary links in the chain. It can be clearly seen from cooperation between fruit and vegetable producers and companies processing these raw materials.
4) Despite the noticeable progress in investment of tools supporting supply chain management, many agri-food companies, especially those operating in a small business sector, are forced to reduce the investment costs in order to ensure the possibility of ongoing functioning in times of energy and economic crisis.

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KEY ISSUES RELATED TO THE USE OF UNMANNED AERIAL SYSTEMS

An important feature that characterizes modern armed conflicts is the large-scale use of aviation. Combat activities of the air force became an integral part of fights, battles and operations conducted in various conditions and in many cases determined their development and final result. Currently, in the center of the media discourse, including political and military, there are e.g., issues regarding the use of Unmanned Aerial Systems (UAV) during an armed conflict. The use of military UAVs in operations in Iraq, Libya and Ukraine confirmed their high usefulness in operations (conflicts) of various intensity. Drawing on practical examples, the article discusses key problems related to the use and integration of UAV. This can be a starting point for a discussion on the challenges associated with their use.

The study used the document research method as well as quantitative and qualitative analysis. A review of the scientific literature on the complex problem of the use of UAVs in the conditions of armed conflict was made. Publicly available information provided by interested institutions was used.

Keywords: Unmanned Aerial System (UAV), military conflict, drone attack.

1. INTRODUCTION

An important feature that characterizes modern armed conflicts is the large-scale use of aviation. Combat activities of the air force became an integral part of fights, battles and operations conducted in various conditions and in many cases determined their development and final result.

At the same time, the analysis of the course of recent wars and armed conflicts allows us to conclude that success is often determined not only by quantitative and qualitative advantage, but above all - information advantage. Currently, in the era of dynamic technical progress and the air-land dimension of the battlefield, the use of Unmanned Aerial Systems (UAV) is gaining particular importance.

The aim of the article was to discuss the key issues related to the use and integration of UAV. It can be a starting point for a discussion on the challenges related to their use in the Polish Armed Forces.

Therefore, the decision to acquire unmanned aerial systems requires that all environments understand the full spectrum of challenges related to their development and use in Poland. It should be mentioned that ultimately these are to be unmanned aerial

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reconnaissance and reconnaissance and strike systems, the essential element of which will be manned strike platforms. In addition, in the future they will carry out tasks as part of joint forces. Their integration therefore requires the implementation of solutions directly related to the concept of their use in the Polish Armed Forces. This, in turn, forces the identification of areas necessary to consider in the context of future integration of unmanned aerial systems in joint forces operations (Chamola, Agarwal, Gupta, 2021).

2. TERMINOLOGY, DEFINITION AND CLASSIFICATION ISSUES

In the 1990s, the name Unmanned Aerial Vehicles (UAV) began to function in Western specialist literature, which gained a wide range of supporters and defines an unmanned aerial vehicle as: a reusable air apparatus (vehicle, object, drone) of any aerodynamic configuration, armament or other equipment that does not carry a pilot-operator and is capable of flight along a programmed route. There are many categories of dividing drones. Depending on their range, size, purpose and nature of use as well as the size of the cargo carried, altitude and duration of the flight.

Classifying them according to the propulsion system, they can be divided into those built in the form of: airplane, helicopter, powered-lift in a system different from the helicopter. On the other hand, the classification according to the aerodynamic system divides them into: fixed-wing aircraft, rotorcraft, as well as balloons and airships. Noteworthy is also the division depending on the method of take-off and landing. This classification divides them into those that can take off in a conventional (independent) way, with support (e.g. catapult) or a combination of both methods. Without going into presenting all possible categories of drone division, it is worth emphasizing that when it comes to unmanned aerial vehicles, we are dealing with a system of which it is a visible element.

It seems reasonable to rely on the standardization documents of the North Atlantic Alliance in terms of terminology. Thus, the term "unmanned aerial system" is understood as all the components of the system necessary to perform the tasks and the relationships between them (unmanned aerial vehicle, control station, payload, data transmission, personnel, supporting elements, system users (AAP-6, 2013). An unmanned aerial vehicle is assumed to be the basic executive element of an unmanned aerial system. The term "unmanned aerial vehicle" should be used for both military and civil applications. Thus, the terms "remotely piloted aircraft system" and "remotely piloted aircraft" adopted by the International Civil Aviation Organization (ICAO) and the European Union are considered at the current stage of technological development as synonymous with the terms "unmanned aerial systems" and "unmanned aerial vehicles" (ATP-3.3.7, 2014).

It is also reasonable to present the typology of unmanned aerial systems in force in NATO. As agreed in ATP-3.3.7. and UAS Tactical Pocket Guide, unmanned aerial vehicles are classified based on the criteria of maximum take-off weight and practical ceiling. Class I includes unmanned aerial vehicles with a take-off weight of less than 150 kg, among which the categories micro (with a kinetic energy of less than 66 J), mini (take-off weight up to 15 kg) and small (from 15 to 150 kg) are distinguished (ATP-3.3.7.1, 2014). This class does not require certification standards in NATO and includes unmanned aerial vehicles, usually "hand-launched", which are in the equipment of subunits and used for reconnaissance within a radius of several to several dozen kilometers. The equipment of unmanned aerial vehicles with a take-off weight below 150 kilograms usually includes optoelectronic

sensors. A characteristic feature of unmanned aerial vehicles of this class are relatively small logistic requirements. They operate at low altitudes not exceeding 1,500 meters and have a limited range and endurance. The typical tactical radius of tasks performed by unmanned aerial vehicles of this class is: up to 5 kilometers for the micro category, up to 25 kilometers for mini and up to 50 kilometers for small unmanned aerial vehicles.

Class II (maximum take-off weight in the range of 150 kg to 600 kg) includes medium-sized unmanned aerial vehicles, also referred to as tactical unmanned aerial vehicles. Aircraft of this class are typically used in brigade-level operations or below for reconnaissance, surveillance and identification of targets. They can perform tasks from unprepared infrastructural landing sites, they do not require large logistic support. They operate at altitudes of up to 5,500 meters, and the typical task radius is about 200 kilometers within the radio horizon. Their equipment includes optoelectronic sensors and laser rangefinders (ATP-3.3.7.1, 2014). In the classifications functioning in the Polish Armed Forces, class II includes two categories of unmanned aerial vehicles: short-range (up to 100 km), which will protect the operations of the brigade, and medium-range (up to 200 km), operating at the division level.

Class III includes unmanned aerial vehicles with a take-off weight of more than 600 kilograms, characterized by a long range and long-term performance of tasks. In the third class, three categories of unmanned aerial vehicles are distinguished: for long-term performance of tasks at medium heights (Medium Altitude Long Endurance – MALE), for long-term performance of tasks at high altitudes (High Altitude Long Endurance – HALE) and strike/combat unmanned aerial vehicles (Strike/Combat). The MALE category includes, in accordance with the typology contained in ATP-3.3.7.1, class three aircraft that can routinely perform tasks at altitudes up to approximately 14,000 meters (45,000 feet), while the HALE and Strike/Combat categories include unmanned aerial vehicles capable of performing tasks at altitudes up to about 20,000 meters (65,000 feet). Third-class unmanned aerial systems, as a rule, require properly prepared landing sites for take-offs and landings, as well as extensive logistic support. They are capable of performing a variety of missions thanks to specific equipment, which may include: radars, lasers, reconnaissance agents, as well as weapons. Thanks to satellite communication systems, unmanned class 3 aircraft can perform tasks beyond the range of the radio horizon (ATP-3.3.7.1, 2014). In the literature on the subject and in the public debate, you can also encounter other typologies, in which the criterion distinguishing features for separate groups of unmanned aerial systems are: flight range (short, short and medium range systems), or the command level of the main user (tactical, operational or strategic) (Ko, Song, 2021).

3. ASSUMPTIONS FOR THE USE OF UNMANNED AERIAL SYSTEMS

The creation of unmanned aerial vehicles has created completely new perspectives in the field of aerial reconnaissance. Considering the fact that native general military commanders chronically suffer from the lack of timely and reliable information about the enemy, terrain and weather conditions, the introduction of UAVs at the level of a tactical compound (unit) may provide an additional source of information (Witczak, Kawalec, Klembowski, 2013). The speed and range of aerial reconnaissance carried out by the UAV clearly proves the advantage of this type of apparatus in relation to the forces and means of ground reconnaissance and is its best showcase.

The purpose of reconnaissance activities at the level of a tactical unit (unit) is to acquire and provide the command, in the shortest possible time, as much data as possible about the current situation on the battlefield, especially about the strength, organization, grouping, movements and intentions of the enemy. The command at every level is concerned not only with the ability to correctly assess the situation, but above all with the proper and rational use of own forces, especially fire resources, and ensuring the continuity and efficiency of command.

The command of each unit and tactical compound has a variety of forces and means of reconnaissance. The use of a specific type of reconnaissance forces and means depends on the situation on the battlefield and the type of combat operations conducted. Reconnaissance helicopters are intended for air reconnaissance in the land forces.

None of the reconnaissance means used so far in the Polish land forces, in comparison with the UAV, provides reliable information about the enemy's movements and regrouping, about its fire assets and about profitable objects on which own strikes can be made. The reconnaissance means currently used by the land forces meet these requirements only to a limited extent. On the other hand, using helicopters for reconnaissance, only some data can be obtained in a relatively small area. This is mainly due to their inadequacy to carry out tasks over the enemy group and poor equipment. The main disadvantage of helicopters is also their relatively high sensitivity to the fire of most anti-aircraft ground assets.

Artillery reconnaissance, on the other hand, has a limited range in terms of depth and is usually aimed at a specific object or area, and is also time-consuming. With the help of artillery reconnaissance, it is possible to determine the location of targets only during fire. The results of this reconnaissance are basically used by the artillery and rarely form the basis for making more important decisions. The results of radio-electronic reconnaissance depend primarily on the chance and mistakes of the enemy. Data from this reconnaissance may also be deliberate disinformation of the opposing party.

With the increase in the mobility of troops, the possibility of masking, the ability to conduct combat operations at night and the range of fire means, the demand for air reconnaissance data has increased enormously. Unmanned aerial vehicles can ensure continuous and systematic tracking of the movement of enemy units and tactical units, which have modern combat technology and the ability to concentrate or transfer their potential in a relatively short time.

To sum up, it should be stated that air reconnaissance significantly complements ground reconnaissance and provides the necessary information to conduct combat operations and protect own forces against surprise from the enemy. On the other hand, skilful use of reconnaissance UAVs, in the case of unreliable data about the enemy, his strength, grouping, areas of reserve concentration, missile launching stations and artillery positions, may be the key to success on the modern battlefield.

Unmanned aerial vehicles – according to many specialists – are characterized by many advantages that sometimes make them superior to airplanes and helicopters in terms of capabilities, especially in the zone of direct contact between the fighting forces. UAVs, for example, can take off and land from any place (a forest clearing, a city street, a small sports field). This allows them to be used in all forms of military operations. This feature allows you to deliver the acquired information to any headquarters, practically without wasting time. They can also perform reconnaissance flights at much lower altitudes than airplanes or helicopters (even 1 m above land), maneuver more freely and freely change the flight course, and use the ground cover much better for camouflage purposes. All this makes it

difficult to detect and possibly destroy the unmanned aerial vehicle. Flight at low altitudes and at a relatively low speed also allows for accurate reconnaissance, while maintaining high reliability of information (Cieślak, Zieliński, 2017).

A very useful advantage of the UAV during reconnaissance is the ability to stay in the designated area for a longer time. This allows the cameras to be used to conduct reconnaissance at the entire tactical depth of operations. This feature makes it possible to use the BSP also to correct and control the fire of its own artillery. In addition, thanks to the UAV, it is possible to accurately (accurately) blow up sabotage or reconnaissance groups in the rear of the enemy.

In the event of destruction or damage to the unmanned aerial vehicle, the material loss is incomparably smaller than in the case of the loss of an aircraft or helicopter. In addition, unmanned aerial vehicles, compared to helicopters, have another feature that is extremely important on the modern battlefield – they consume much less fuel, are quieter and more difficult to locate and destroy by enemy air defense means.

According to military experts, the main UAV reconnaissance tasks may be as follows:

- reconnaissance of the composition and grouping of the enemy's forces, its most important fire assets (primarily means of delivery of nuclear weapons), the system of engineering barriers, as well as the command system in the tactical defense zone,
- detection of reserves and identification of troop movements (mainly tank units) and their continuous tracking,
- detection of drop zones and operation of enemy airborne troops and special groups,
- precise determination of the course of the front edge of the defence, rear and depot locations, checking the condition of roads and bridges and detecting possible contamination zones,
- observation (monitoring) of own wings, in order to prevent the break-in of reconnaissance groups and separate units of the enemy,
- supporting other own means of reconnaissance by indicating objects and newly detected areas of the deployment of enemy troops,
- correcting artillery fire and indicating newly detected targets for firing,
- recognition of the effects of own fire means,
- monitoring the correctness of camouflaging own troops,
- simulating the movement of part or all of a force in order to mislead the adversary as to his intentions.

Aerial reconnaissance using UAVs can now be carried out by: visual observation, photography and radio-electronic reconnaissance. The choice of method depends on the nature of the task being performed, reconnaissance equipment, the enemy's influence, the time of day and year, and the weather.

In conclusion, it is worth mentioning that the experience gained from the use of unmanned aerial vehicles in combat conditions shows the advantages that can be formulated as follows:

- great capabilities in the field of air reconnaissance, radio-electronic warfare, targeting, artillery fire correction, feign and demonstration activities,
- the ability to transfer data, including to lower levels of command in real time,
- long service life due to small radar reflection surface, small thermal footprint and low noise level,
- the ability to perform tasks in strong anti-aircraft defense zones,

- the ability to focus effort in designated areas and then transfer it elsewhere, to more threatened directions,
- high maneuverability of the ground system and simplicity of its operation,
- low operating costs compared to manned aircraft and helicopters.

4. CONCLUSION

Since the beginning of their existence, unmanned aerial vehicles have been designed mainly for reconnaissance and radio-electronic countermeasures, as well as for detecting and locating targets. The UAV equipment variant depends mainly on the tasks assigned to them by the user. As a rule, the set of equipment includes: radar, optoelectronic, infrared searching and recording devices, special video cameras adapted to low light, classic and panoramic cameras, and laser target illumination.

To sum up, with the development of microelectronics, the improvement of cameras and their miniaturization, the importance of unmanned aerial vehicles, used both for military and civilian purposes, is growing. The advantage of UAVs are small dimensions, and thus a reduction in the risk of being detected by enemy radars, high mobility, low cost and, most importantly, sending them does not involve risking the pilot's life. More and more often, such devices are used to perform observation, reconnaissance flights or flights related to the verification of compliance with international agreements. They are also increasingly used by the police to track drug smugglers or control traffic.

For many years, there has been a great interest in small and cheap, remotely controlled, unmanned aerial vehicles. In recent years, this interest has grown, mainly due to the needs of our armed forces, and in particular the land forces involved in Iraq for almost two years.

The demonstrated advantages of unmanned reconnaissance devices prove that they should be a permanent element of the armament of the Polish Armed Forces. Given the fact that Poland has a huge scientific and research potential (The Air Force Institute of Technology – AFIT and Military University of Technology – MUT) and extensive experience in constructing flying devices, it may be surprising that they are still not in service. At the same time, attempts to explain this fact with the lack of funds, in the author's opinion, seem to be passing the truth. What's more, in the conditions of a huge quantitative and qualitative development of means of combat, the introduction of Unmanned Aerial Systems should be one of the most important undertakings in the land forces in the coming years.

To sum up, one of the priorities of the technical modernization of the Polish Armed Forces for the coming years should be the acquisition of reconnaissance and reconnaissance and strike unmanned aerial systems. In this context, it is extremely important that the representatives of the political, military, scientific or industrial circles, as well as the media, understand the complexity of unmanned aerial systems, based on substantive premises. A comprehensive perception of all components is necessary to develop detailed conceptual, organizational and technical requirements related to the development and use of such systems in our country.

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Vol. 27, No. 2(2022)

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Previous name of the Journal: *Zarządzanie i Marketing*, ISSN 1234-3706
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Reviewing standards, information for authors, the review form, instruction for authors and contact details to MMR Editors and to Publishing House are also published in the fourth number of Modern Management Review, Vol. 27, No. 4(2022).

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❒ **Yes, but after the remarks specified in point 9 are corrected**
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