

Годишник на

Висше училище
по телекомуникации и пощи

том VI

2022

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ГОДИШНИК НА ВИСШЕ УЧИЛИЩЕ ПО ТЕЛЕКОМУНИКАЦИИ И ПОЩИ

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Concept and Model of Application for Remote Health Management

Aleksandar Tsenov¹

Abstract – In this paper an overall concept and detailed model of an application for remote health management are given. The main idea is the creation of a specific application, that should collect information about the health status of a persons (complaints, symptoms, chronic diseases) in three different ways: with use of appropriate mobile application (only for achieving access to the main functionality), from the personal health monitoring systems PHMS (sensors, measuring devices – connected through IoT capabilities) and by phone call to a Call center. The Cloud application should authenticate the person, analyze the data collected and find the right decision regarding the health status of the user. To the user must be sent a message with instructions for the next actions the person should undertake, including, if necessary, visit the nearest medical center that is found from the application.

Keywords – health monitoring, cloud application, decision making, artificial intelligence

I. INTRODUCTION

Health management is a process of purposeful impact to ensure the effective functioning of the health system, coherence of all subsystems and processes occurring in it to reduce entropy through planning, management, regulation and control in order to achieve full satisfaction of the health needs of the population at available resources and in the particular environment [3].

The management cycle includes:

- analysis of the situation;
- setting goals, which can be:
- public and private
- intermediate and final
- near (short-term) and distant (long-term);
- Making decisions;
- organizing the performance;
- performance monitoring;
- performance evaluation [3].

In the time of ubiquitous digitalization, rapid development of information technologies, all these tasks are implemented in digital solutions using modern information architectures, thereby providing direct access to health management to an increasingly wide range of users.

II. DIGITAL HEALTHCARE

A. Perspectives and Challenges

While politicians try to solve the problem of affordable healthcare, computing experts work behind the scenes developing tech that promises to revolutionize and streamline

healthcare services.

These innovations, known as digital healthcare, will not only improve the diagnosis and treatment of chronic and short-term illnesses but help patients improve their physical and mental health. By encouraging good health and catching problems early, the exorbitant cost of healthcare can be greatly reduced [4].

The goal is to make healthcare more proactive than reactive. Here are some things you should know about the digital healthcare revolution.

- *Digital Tools Will Give a Healthier Lifestyle* - Instead of only worrying about disease, people can maximize their quality of life by eating better, exercising, avoiding cigarettes, and limiting alcohol. Healthcare technology can provide the information, motivation, and encouragement to do that. The majority of health apps out there focus primarily on fitness and weight loss. But, in the realm of healthcare, there are apps designed to track your emotions, symptoms, and sleep patterns, while others will maintain your prescriptions and health records or keep your mind sharp with a plethora of puzzles and games [4].

- *Smartphone Apps Can Create Better Digital Health* - Nearly 60 percent of smartphone users have downloaded a health or fitness app. The popularity of these apps in helping people monitor their calorie/nutrient intake and track their physical activity continues to climb. Developers see the opportunity to integrate health monitoring and disease prevention into a well-rounded health navigation system. In addition to promoting good health, these navigation systems can better assess chronic conditions like diabetes and epilepsy. Currently, patients rely on sporadic visits to the doctor where healthcare decisions are based on infrequent measurements. Digital tools allow patients and doctors to continuously monitor vital signs like heart rate, blood pressure, oxygen saturation, weight, and blood sugar, making treatment more accurate and timely. Digital tools can also help in case of emergency. Doctors can be alerted in real-time about changes in their patient's condition. In addition, caregivers can intervene if, for example, elderly dementia patients begin to show signs of agitation and troubling behavior [4].

- *Artificial Intelligence Will Give Better Health But Integration Remains a Challenge* - Health analytics that use artificial intelligence are ideal for massive data sets like medical images and pathology test samples. They also provide a more accurate diagnosis and understanding of individual health or the health of large populations. Additionally, digital health standards have been developed to create a single-

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identity electronic health record system, even though such integration will likely take a long time to achieve. Likewise, mHealth and wearables compose a highly fragmented market, with each product or service contained within its own silo, limiting compatibility or connection to broader networks. Nonetheless, while digital health developers have a long way to go in building greater integration, the technology itself is flourishing [4].

B. Digital transformation in healthcare and cloud technologies

The healthcare industry's technological obstacles are numerous and sometimes difficult to overcome. Many practitioners rely on outdated IT infrastructures that cannot support changing industry practices and insufficient security measures that do not adequately protect against increasing cyberattack risk. Migrating to the Cloud is a cost-effective and reliable first step to jumpstart digital transformation in the healthcare industry [1].

As healthcare providers begin the process of digital transformation, cloud tech offers many benefits. They include:

- Scalability.
- Data storage and sharing.
- Data loss prevention and disaster recovery.
- Enhanced collaboration and communications.
- Improved cybersecurity.
- AI and machine learning deployments.
- Increased networking speed and efficiency.
- Greater data merging and access through various sets of applications and automation.
- Increased patient engagement through various sets of applications and automation.
- Management of IoMT devices and data.

C. Goal of this work

The main goal of the work is to provide an overall System concept of a cloud-based application for remote healthcare monitoring

III. SYSTEM CONCEPT

The concept of the system proposed is based on the following main functional blocks and roles – Fig. 1:

- User of the system – A user of the system can be a person with an established disease, a patient covered by a personal health monitoring system or any individual in need of (immediate) health care. For this purpose, three different options for accessing the service are foreseen: through the used personal health monitoring system, through a mobile application or through the mediation of a call center;
- Personal health monitoring system, mobile application, Call-Centre - In the first two cases, data is transferred to the cloud service directly in the format with which the service works. The personal health monitoring system sends the health status data in the generally accepted format of the relevant health characteristics. In the mobile

application, the user selects from preset menus his current symptoms in a form, that he understands. The mobile application should correlate the current symptoms indicated by the user into causally determined health parameters and submit them to the cloud service. In the third case, when using the Call Centre, the operator applies a desktop application, analogous to the mobile one, which also contains the correlation (mediator) function;

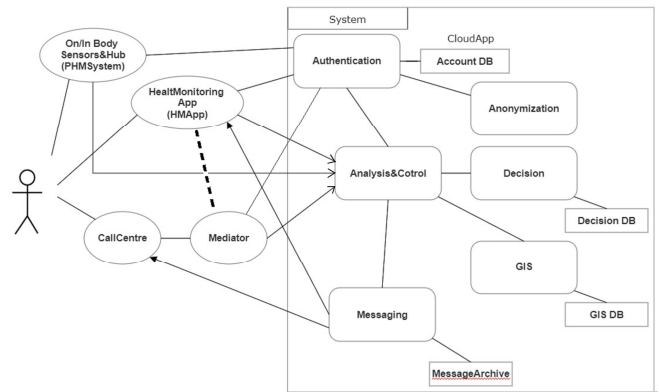


Fig. 1 Functional concept of the Intelligent Health Monitoring System

The system consists of four data bases, each one is serving the separate functions.

The collected data are sent to the "Analysis&Control" block, but they are not being analyzed until the Authentication function sends an trigger-signal, that the request is processed and the user is authenticated for using the application. The authentication process includes an anonymization function, according to the GDPR rules. A new record is made in a separate Account DB.

The most important and the most complex function is provided by the "Analysis&Control" function. The function finds e decision for actions needed to be sent to the users according to their pains, moans, symptoms or data from their personal health systems. The function should use self-learning features and artificial intelligence capabilities. New correlations between signs of ill health and possible diagnostics are stored to the corresponding data base, and the decisions are made will be stored to the decisions data base.

After that, using the "Messaging" function, a message to the user is constructed. The message contains the action needed. In case of necessity of visiting a health center, with help from the "GIS" (Geographic Information System), the location and the road to the nearest health center is included in the message. The messages are stored to the Message archive for further analysis and control.

On Fig. 2 a process flow of one possible case of use of the system is shown.

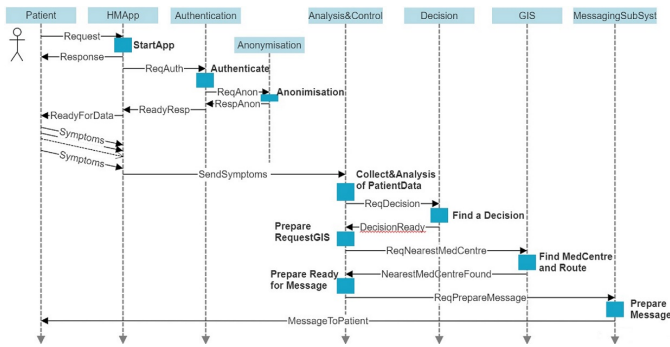


Fig. 2 Sequence diagram of a overall system functionality

IV. FUNCTION BLOCKS AND DATABASES

A. Authentication and Anonymization

The Authentication function block performs the normal tasks of a system user account management module. In addition to creating a user profile, this block, together with the anonymization block, must perform one very important task: preserving users' personal data and ensuring the inaccessibility of users' health data. This is extremely important in terms of meeting the requirements of the European GDPR regulations and protecting users from malicious access and use of their personal information.

User data is collected from the mobile application that is tasked to provide access to the system, from the personal health systems of the patients covered in the remote health care and from the call center. They must be transmitted via secure communication channels and stored in a database, where they are stored in a properly coded form.

B. Analysis&Control and Decision

The two functions work together. The analyzing function collects the information about the current health status of the authenticated users of the system. Through a system of filters, a library of symptoms and complaints, using self-learning techniques and artificial intelligence, the analysis function looks for the correlation between the user's data and the possible causes of his condition. Together with the Decision function, a preliminary diagnosis is determined by applying three different decision options.

- Decision based on reasons {Fig. 3)- The data submitted by the user is correlated with the occurrence of a health condition determined by the content of this data (symptoms or results of the operation of personal health systems).

The Control function refers to the Authentication and the collection of user data.

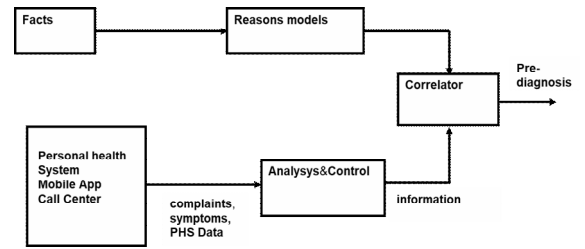


Fig. 3 Reason - based decision making

- Rule-based decision (Fig. 4)- The decision in this method is based on deviations of health parameters from their normal values.

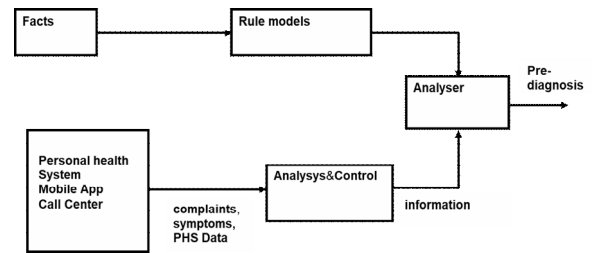


Fig. 4 Rule - based decision making

- Knowledge based decision - In this method, after obtaining and analyzing the data, a solution based on available knowledge is sought in a database of already solved analogous cases.

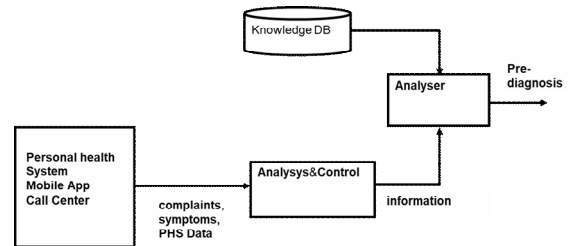


Fig. 5 Knowledge - based decision making

The results of the first two methods can be entered into the database of solved cases. In this way, the knowledge of the system is enriched and its self-learning is supported.

C. Geographic information System (GIS)

A geographic information system (GIS) is a system designed to discover, store, manipulate, analyze, manage, and present all types of geographic data. The key word for this technology is geography – this means that some of the data is spatial. In other words, data that is somehow related to locations on the ground [6].

Associated with this data is usually tabular data known as attribute data. Attribute data can generally be defined as additional information about each of the spatial features. [6]

In this work GIS is used to produce detailed data on the location of health centers of different types in a given region. The actual location of the health centers represents the spatial data. Additional data such as the type of health facility (hospital, health service, consultation center), the areas of pre-hospital and hospital health care for each health facility, work schedule, navigation information to reach the health facility from a given location (the location of the system user) and others. make up the attribute data. Due to their diversity and heterogeneity, these data will be organized in a specialized database.

D. Messaging Sub-System

The Messaging Sub-System has the aim to construct the messages, that should be send to the users of the system as a response to their activity by working with the system.

The message should include a set of obligatory and optional attributes, such like:

- User account data;
- Time stamps;
- User info (being sent to the system by the user);
- Pre diagnosis (as a decision, made on the user's complaints, symptoms or PHMS-Data;
- Suggestions or recommendations for following actions;
- Location(s) of the nearest Health Center and navigation info for rapid reaching of the Center;
- Recommendations about immediate medicine use (if necessary) and so on.

The Message should be sent directly to the user's Mobile Phone, or should be displayed on the PHMS screen (if available).

If it is not possible to send an electronic message to the user, the information is transferred to the Call Center and the user is called by phone.

V. CONCLUSION

In this paper an overall concept and partially detailed model of an application for remote health management are given. The main process flow and the main function blocks and their purpose are described.

The research and development of the proposed system continues with the main goal - to achieve a high-quality health service for the widest possible range of the population, using modern ideas, methods and means of digital health.

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Bulgarian Food and Beverages Companies Toward Industry 4.0 and Beyond

Petya Georgieva¹

Abstract – Based on some expert predictions from World Economic Forum there is the necessity of transition from Industry 4.0 toward Industry 5.0 shown in the paper. Short observation of industrial development history and main characteristics of industrial development are present. Author of the paper shares a futuristic vision for Industry 6.0 of other authors.

The research uses systematic analysis of literature studies, interviews with practitioners and experts, and surveys to 28 food and drinks companies and transformed Maturity Model of 4.0 Readiness Assessment in smart manufactory companies from 28 Food and drinks industry in Bulgaria. There are some conclusions and recommendations suggested.

Keywords – Companies, Technology readiness, Industry 4.0, Innovations, Food and Drinks Industry.

I. INTRODUCTION

The May 2022 Chief Economists Outlook comes out amid extremely high uncertainty about geopolitical developments, the trajectory of the global economy and the next steps for economic policy. Instead of entering a post- COVID recovery phase, economies are experiencing additional shocks, first and foremost from the war in Ukraine and associated geopolitical repercussions, but also from new outbreaks of COVID-19 and lockdowns in major industrial centers.

Chief Economists have future expectations in the next 10 years as well as:

- 1) Higher inflation alongside lower real wages globally
- 2) Food insecurity in developing economies
- 3) More localization, diversification, and politicization of supply chains in multinational corporations
- 4) Greater rollback of globalization in goods, labor and technology than services
- 5) Sanctions effective in dampening the economic outlook for Russia
- 6) Continued dominance of the US dollar as a global reserve currency [3].

Cross- point of these challenges is cooperation between different countries, industries and regions. Technologies are the keys for its turn to reality. In the sense of above mentioned countries and their companies have to be prepared for the future uncertainty and for the technology- push changes.

Steps toward preparedness for the future go ahead company's preparedness for Industry 4.0.

II. THEORETICAL FINDINGS

Today, advanced digital technologies have been grooming worldwide with the speed of light. In contrast, industries and businesses face lots of trouble embracing advanced technologies to teach their changing behavior. Industries have to work with the speed of light to get their momentum, to conquer with these advanced high- speed technologies. These transformations can quickly be adopted by moderating or the agile mindset of industries. Digitalization in technology is the voyage, not a terminus; it supports the business models, medical system, manufacturing industries, etc., for their growth and shapes business and benefits customers. All are at the hinge point where things are changing exponentially, changing from mechanization to electrification, to electronification, to computation, to mass customization, to mass personalization, to virtualization, to digitization, to intelligization, to robotization, to mobilization. [5]

Main characteristics of industrial development are present

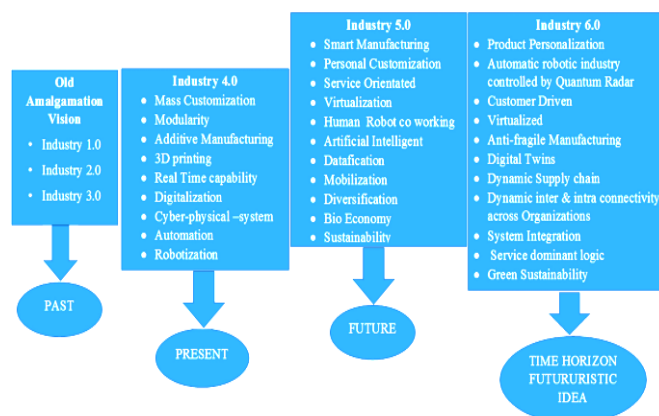


Fig. 1. Characteristics of industrial development [4]

in

The human society went through three big industrial changes:

The First Industrial Revolution was marked by a transition from manual production methods to machines powered by steam or water.

Thanks to electricity, *the Second Industrial Revolution* transformed factories into modern production lines resulting in high productivity and significant economic growth.

The Third Industrial Revolution saw field- level computers like programmable logic controller and communication technologies in the production process, leading to automated production. In the Industry 4.0 era, production systems can

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make intelligent decisions through real-time communication and cooperation between “manufacturing things”, enabling flexible production of high-quality personalized products at mass efficiency [15].

The Fourth Industrial Revolution (Industry 4.0) originated in 2011 from a project in the high-tech strategy of the German government. It advanced the concept of Cyber Physical Systems into Cyber Physical Production Systems. Smart Factory is one of the key associated initiatives of Industry 4.0. The term Industry 4.0 was publicly introduced in 2011 at the Hannover Fair, and it is on the back of the following definitions of the first three Industrial Revolutions.

From organizational point of view, Society 5.0 (Industry 5.0) seeks to create new methods for operating individualistic systems where companies, universities and governments independently strive to create a collaborative operational concept boosted by current societal interconnectivity. A sustainable society is involved in and attends to its present without compromising the opportunities of the future, thus organizing itself to improve the quality of life and autonomy of citizens that comprise it and to aspire to common welfare. [2, 6]

Nowadays, researchers are starting to think beyond Society 5.0 (Industry 5.0), to Industry 6.0. Industry 6.0 is the idea, which varies according to the need of industries. Sometimes it is ubiquitous, customer-driven, human-centric, anti-fragile manufacturing, virtualized, human co robot centric and homogeneous assets, etc. The future prediction for Industry 6.0 is to hyper-connect the industries to industries, highly mass customization, highly mass personalization of services and products with the attachment of dynamic supply chain management concept, highly customized class one lot size thinking where all the information can drift all across the countries. The spread of COVID-19 has broken the economic backbone of all countries and left its instances for many years. This worldwide crisis has compelled industrialists and service providers, medical, non-medical, and policymakers, to rethink how to manufacture the products and provide customer services. [2]

Most of the countries in the world is in transition to Industry 4.0 and 5.0 now. Characteristics of Industry 6.0 are the horizon futuristic idea of S. Chourasia, at. all.

III. EXPERIMENTS

The research used systematic analysis of literature studies, interviews with practitioners and experts, and surveys to companies.

Based on literature author of this paper use the Lukmanulhakim's model [9]. The model concerns maturity and assess readiness of companies for Industry 4.0. It is based on enhancement and mixture of models as follows: Reference Architectural Model for Industry 4.0 (RAMI 4.0) [13] and models from Schumacher et al. [10], Rojko [14], Lichtblau et al. [8], IMPULS [1, 7] and Singapore Economic Development Board [11].

In order to define company readiness profile author of the paper uses questionnaire consists of questions in areas of five

dimensions. They covering 34 maturity items, which are group into these dimensions (Table I) [9, 10, 12]:

TABLE I
PRODUCTION COMPANY READINESS [9, 10, 12]

Dimensions	Sub Dimensions
Technology	Automation, Equipment readiness for I4.0, Machine integration & interoperability, Operation data collection, IT & data security, IT system support, Processing & analysis capability.
Product and Services	Product customization, Data-driven services, Digital features of products, Level of product data usage
Company Operations	Vertical integration, Horizontal integration, Share of data used, Supply chain integration, Integration to CPS, Supply chain visibility, Supply chain flexibility, Integrated product lifecycle, Digital modeling, Data usage, Autonomous process.
Strategy and Organization	Degree of strategy implementation I4.0, Strategy & management I4.0, Collaboration, Innovation management, Investment strategy I4.0, Organization structure, Team leadership, Teamwork.
Human Resources Capability	People's capability, Leadership competency, Learning process, Adaptation process.

Maturity items are separated into dimensions and sub dimensions. Dimensions concerns areas of company's competence in order to be prepared for Industry 4.0. Sub dimensions shows fields of specific capability.

Companies are grouped in three types- newcomers, learners and leaders depend on level of maturity (readiness to Industry 4.0). Six levels of maturity are used to evaluate sub dimensions as shown in Table II.

Table II
COMPANY'S MATURITY AND READINESS EVALUATION [9]

Levels of maturity	Types of companies
"0" not ready- companies not ready to meet the requirements of I 4.0.	Newcomers - companies that do nothing or very little with I 4.0.
"1" beginners- companies involved through pilot initiatives in various departments and investments in one area.	
"2" intermediate- companies incorporate I 4.0 in their strategies.	Learners - companies that have taken its first steps in I 4.0 implementation.
"3" experienced- companies have the I 4.0 strategy and implement it several areas.	Leaders - companies which are well on their way to I 4.0 implementation.
"4" expert- companies implement the strategy I 4.0 in most areas and monitor it with indicators.	
"5" top performer- companies have I 4.0 strategy implemented in the hole organization and regularly monitor it's absorption in their projects.	

IV. RESULTS

The results are summarized from interviews of 28 food and drinks companies with two employees per each- ICT and production managers.

Overall average score is:

- Technology- 3 (Leaders)
- Product and services- 2.96 (between Learners and Leaders)
- Company operations- 2.41 (Learners)
- Human resource capability- 3.25 (Leaders)
- Strategy and organization- 2.25 (Learners)

In general, industrial enterprises from the food and beverage industry in Bulgaria are not prepared for the digital transformation. Digitalization becomes possible when, before it, all processes are clear, structured and simplified or are broken down into separate operations. This is relate to the availability of quality management systems as well as integrated systems for digitization of production and business. Part of the enterprises owned by foreign companies (30% of the number of enterprises in the research) have the necessary systems. See Fig.2.

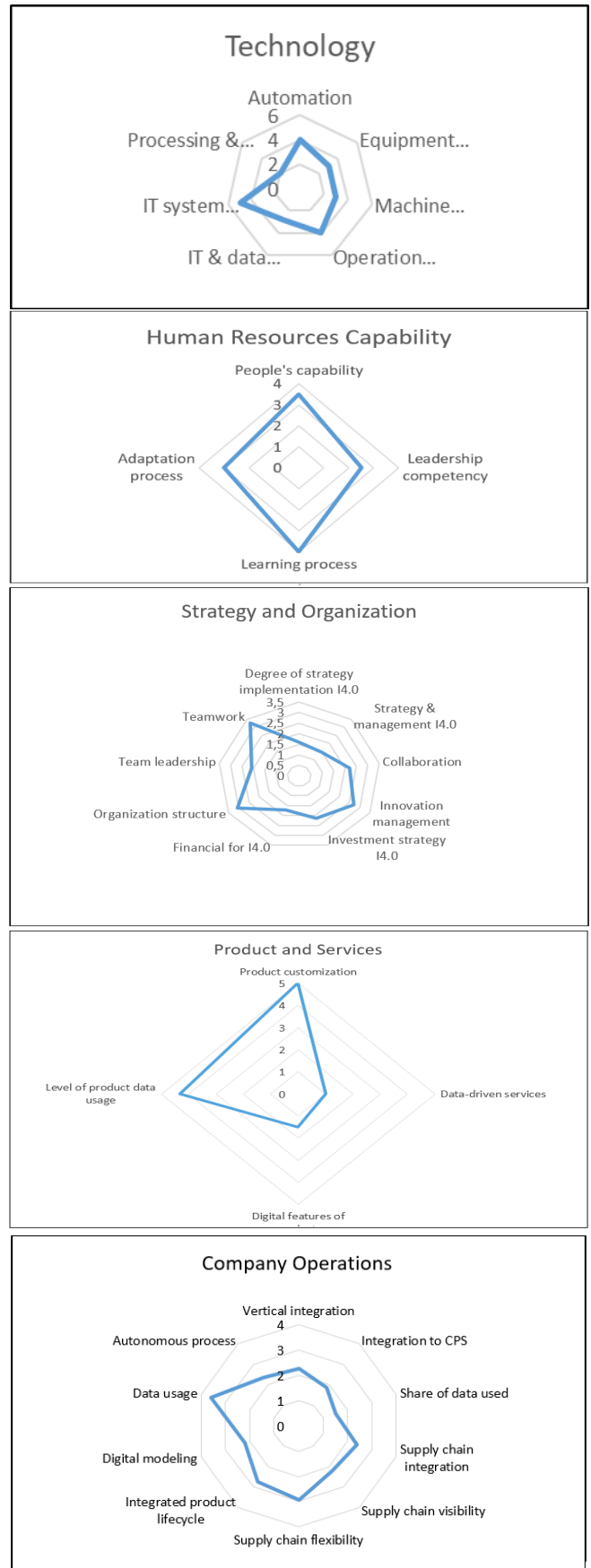


Fig. 2. Company readiness

While most of enterprises created entirely by Bulgarian entrepreneurs after the advent of democracy (70% of the number of enterprises in the research) yet have to partially introduce information systems for the digitization of production and business management.

On the other hand, some managers said that the lack of well-developed digital environment in Bulgaria is the reason to low digitization degree implementation. It is difficult for enterprises to operate in not well-established (from regulative point of view) environment and people are not ready and motivated to improve and enhance their digital skills.

V. CONCLUSION

From one hand, industrial enterprises from the food and beverage industry in Bulgaria have to be supported by government with different initiatives and digital infrastructure toward Industry 4.0.

From the other hand, the level of Bulgarian society digitization is not enough to push people implement new technologies in their life. This means that lack of high technological applications in university, work and home leads to low motivation to learn and use them more. This takes place despite of national and EC strategies and initiatives.

In order to foster digitization in Bulgaria the recommendations are:

- More inclusion and engagement of society, not only formal, in bottom-up strategy decisions and problem solving in order to ensure their efficiency.
- More smartness and foresight in national priority defining.
- Building complex national innovation strategy including all fields of our society life.

In order to be prepared for Industry 5.0 and beyond Bulgaria has to accelerate its transition to Industry 4.0 by improvement and enhancement of digital environment.

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Communication Strategies in Demagogy and Linguistics Demagoguery

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Demagoguery beats data in making public policy.

Dick Arme

Abstract – Communication strategies are an extremely important tool in the application of *demagogy*¹ and its hyponym *linguistic demagoguery*. As a strategy, demagogy has been known since the early period of Athenian democracy: it had been used by the Sophists to gain influence over the demos and achieve power in governing it by deliberately misleading the audience. Linguistic demagoguery is one of the manifestations of demagogy, applying various stylistic, intonational and other linguistic means, including in its tools the rich phraseological and paremiological fund of each language to achieve delusion with a pragmatic and in many cases - self-seeking purpose. A relationship is made with John Austin's Speech Act Theory as well as one of its manifestations – *perlocution* – a characteristic impact feature of fake news. It is concluded that demagogy and linguistic demagoguery are directly related to *leadership* with regard to the communication strategies for behavioural impact embedded within them.

Keywords – communication strategies, speech act theory, demagogy, linguistic demagoguery, paremias, fake news

I. INTRODUCTION

Nowadays, *communication strategy* in most cases refers to the use of the term in business management environment mainly as a plan through which a company can achieve communication goals - such as setting goals for good communication, choosing a target market and then formulating an action plan according to the set goals. Built on such a scheme, the communication strategy enables the organization to build its own specific model for creating a methodology for effective sharing of information both vertically and horizontally, and outside the organization.

The subject of the present study is the essence and the relationship between *demagogy* and *linguistic demagoguery* - two terms that are very up to date today, besides they are semantically and taxonomically related. The first is a hyperonym over the latter. The hyponym "*linguistic demagoguery*" involves as its main meaning the embedded in the hyperonym idea of manipulating people through appeals and promises without any real guarantee of their fulfilment. Linguistic demagoguery achieves these goals mainly through linguistic means, which are the basis of demagoguery communication strategies; they are the object of research in view of their increasingly resourceful and successful application by managers and politicians with different leadership styles.

II. DEMAGOGY – ETYMOLOGICAL ANALYSIS AND SEMANTIC WORD SHIFTS

Retrospective analysis helps to clarify that demagogy is a strategy for gaining influence by misleading the public to convince the demagoging person (demagogue) of his "rightness". The Oxford Dictionary states that the etymology of the term demagogy derives from the Greek term demagogue (mid-17th century "dēmagōgos", from "dēmos" - "people" + "agōgos / agein" - "lead", cumulatively meaning "leader of people") [2]. Apparently, the lexeme demagogue did not initially have a negative connotation: in ancient Greece, it was used as a synonym for a democratic politician, a popular tribune. Of particular interest is the study of the Etymological English Online Dictionary, which indicates 1640 to be the first use of this lexeme with a certain negative connotation - "unprincipled popular speaker or leader; one who seeks political power, guided by the prejudices, desires,

¹ In English there is no contrasting distinction in the semantics and use of the terms *demagoguery* and its hyponym *linguistic demagoguery* (the latter used in Bulgarian language as „езикова демагогия“). On the contrary, there are two terms in English with similar spelling that are used as absolute synonyms: “demagogy” and “demagoguery” – „the action of winning support by exciting the emotions of ordinary people rather than by having good or morally right ideas“[1].

Therefore, the following clarification needs to be done in this paper: the term *demagogy* is to be used for the Bulgarian term “демагогия”(as these terms are used most commonly in correspondence to each other) and the term *linguistic demagoguery* to stand for the Bulgarian term “езикова демагогия”.

Another clarification: this study of communication strategies in language demagoguery has been conducted based on examples excerpted from the Bulgarian language – its morphology, intonation, phraseological and paremiological fund.

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ignorance and passions of people or part of them." The same dictionary traces the roots of the lexeme, making references to the use of the French word *démagogue* as early as the middle of the 14th century [3]. Thus, gradually but steadily, the term acquired a negative meaning among the political opponents of democracy - it began to be used to name figures who sought to gain popularity for themselves through false promises, flattery to the members of the National Assembly, etc. This is how the lexeme *démagogue* undergoes a semantic shift of the axiological vectors of the word from a positive to a negative connotation; it began to denote the kind of leader with unacceptable qualities such as individualism, narcissism, hypocrisy, pretence, cunning, etc., whose appearance is associated mainly with the times accompanying Athenian democracy (5th century BC). The principles of Athenian democracy, based on the guiding principle of equal participation of all citizens in the work of the National Assembly and in the governing of the polis, had been objectified mainly through citizens' public appearances. Therefore, mastering the power of the word had meant (and still means) sure success in political life and therefore – a necessary condition for a successful political career. For this reason, the flourishing of Athenian democracy since this period has inevitably been linked to the active development of public speaking because of the strength of the various communication strategies that can be implemented. Its value and power as an indispensable tool for influence and persuasion, especially for manipulating public opinion, were well known in ancient Greece. It is no coincidence that the art of mastering the oratorical style of speech was considered the most important part of ancient education, philosophical and political thinking. Thanks to the sophists, the subject of rhetoric is seen as the art of persuasion and impact, and the main goal of the sophist speaker is not to reveal the truth, but to convince the audience of the correctness of the speaker's opinion. Originally, demagogues came from aristocratic families - well-educated, perfectly versed in public speaking and basic speech techniques, thanks to which they were able to convince the audience of whatever they wanted. Although democracy gives power to ordinary people, there is still a tendency in elections to maintain the aristocratic class that supports debate and modesty. History shows Pericles (444-429 BC), an ancient Greek politician who ruled Athens in the second half of the 5th century BC as a good example in this regard. Gradually, demagogues were becoming a new type of leader - emerging from the lower classes, they directly appealed to the emotions of the poor and uninformed, persecuted power, using lies to cause hysteria. At the same time, they skilfully took advantage of crises to increase public support for their calls for immediate action and greater power [4]. Nowadays, demagogues are rather divided not into lower or upper classes, but into representatives of different parties in different areas of the left, right or centre, with the main goal of using demagogues' different communication strategies for manipulation and propaganda. In the modern world, the power of the word has been increasingly realized and therefore used more and more as a tool to influence, persuade, and manipulate opinions, attitudes and preferences. In the new

social, political, economic and technological conditions used are not only the old, well-tested oratory tools, but also new ones: intertwining facts with fake news spread through traditional communication channels - radio, television, press, and through the most popular social networks and all other opportunities provided by the Internet.

The term *demagogy*, which originated in ancient Greece, degenerated into *ochlocracy*² over time, and according to the Modern Russian Encyclopedia (and other lexicographical editions), the lexeme *demagogue* acquired an ironic meaning thanks to the works of Aristophanes (446 - 386 BC), who first used the term in reference to the Athenian statesman Cleon - the leader of the People's Party after Pericles' death. Cleon introduced a new oratorical style, quite different from the dignified restrained persuasive style of his predecessor. According to Plutarch, Cleon ceased to observe any decency in the speaker's rostrum: he shouted, threw his cloak off his shoulders, hit his hips, ran back and forth during the speech" [6]. The famous ancient Greek comedian denounced the new demagogues of unknown origin, seeking to gain fame through *bombast, deliberate perversion of facts, false promises, deception, and flattery*. During this period, the term "demagogy" acquired a pronounced negative connotation in the sense of a form of manipulation of people's consciousness. Thus, "demagogy" acquired an *axiologically negative meaning and is defined as an immoral way of influencing people* through these methods.

The modern meaning of the term *demagogy* is "impact on people's feelings, instincts, consciousness, based on deliberate distortion of facts; on inciting passions to achieve certain, usually political, goals; high-spirited reasoning disguising some selfish purpose [7]. It is no coincidence that the term is most widely used to refer to *political demagogy*, which refers to political leaders' activities who provoke the opinions and moods of the crowd for their own selfish goals. The term is used to describe one of the *negative consequences of democracy - uncontrolled freedom of speech*.

Demagogy is on the border of the metaconcepts of *truth* and *lie*, and it is such a mixture of them, as well as of *justice* and *slander, cunning, misrepresentation, perversion, hypocrisy, exaggeration, concealment of truth, even flattery* that for the unprepared person it is difficult to distinguish where truth ends and where lie begins.³

III. LINGUISTIC DEMAGOGUERY - THE MAIN COMMUNICATION STRATEGY OF DEMAGOGY

² Ochlocracy - (from Greek *ochlos* - people belonging to the underprivileged classes, mob and *kratos* - power, authority). Dominance of the crowd, of the lower, poor classes (Aristotle's term, used later in the bourgeois language. – In [5])

³ These (and other) subconcepts are the basis of the author's study of the binary opposition of the metaconcepts "truth - lie" and its reflection in the Bulgarian national mentality through our paremiological wealth. [8]

Linguistic demagoguery is a phenomenon of our daily life, described by Prof. Stefana Dimitrova in her monograph of the same title, which partially reflects the life and philosophical meaning of the term *demagogy*; for this purpose, some linguistic models used as tools of this hyperonym phenomenon have been studied. Linguistic demagoguery is related to a particular way of communication that allows some additional and often dubious or challenging information to be added to the main and authentic message, diverting the listener's attention to a certain prescribed direction. Such intertwining of true facts, along with misleading the listener on certain issues, distracting from the main topic, inculcating subjective opinions and assessments for objective facts of reality, makes linguistic demagoguery a complex linguistic and social phenomenon. "Linguistic demagoguery should not be judged unequivocally on a good-bad scale. Sometimes it can be thoroughly malicious and misleading, in other cases it is innocent and reflects only certain traits of the speaker's character. In others, it can be very useful - for example in diplomatic negotiations, in business communication, in advertising [...] " [9]. It is in this way - with positive and negative values in the axiological scale that this phenomenon is objectified in the Bulgarian paremia⁴ picture of the world, which will be discussed below.

The author comments on the use of "the small words of great importance" (ibid.: 9) as conjunctions and particles, such as the amplifying particle "after all" (Bg „та нали“), which serves to integrate the position of the listener to the position of the speaker. The function of recalling past facts, of drawing attention to previous events, makes it difficult to recognize linguistic demagoguery. Sometimes some of the small words with which dubious information is presented, such as "and; even; right; indeed, forsooth; actually, in fact" (Bg „та, дори, нали, наистина, всъщност“) are interchangeable, and this ability makes them an even more convenient means of linguistic demagoguery. Remaining somehow invisible in the text, they retain their directing potential and in an elusive way highlight a specific part of the meaning of the sentence.

It can be said that the conjunction "and" (semantic meaning "also, as well, too") (Bg „и“) has a multifunctional role in linguistic demagoguery. If, for example, we talk about a woman working in the field of science and say, "She is beautiful as well" (Bg „Тя е и красива“), by default through language demagoguery it will become clear that she, in addition to be a researcher, which requires certain intellectual qualities is not only smart *but also* beautiful. On the other hand, if a mannequin, fashion model, or gymnast is said "She is also smart" (Bg „Тя е и умна“), again by default due to language demagoguery it will become clear that the woman in question, whose profession requires beauty or charm, flexibility, proportion and elegance, is not only beautiful and graceful, but *at the same time* smart.

Another specific use of this conjunction is often observed in our time: in addition to its joining and amplifying function, in

this case the *illocutionary*⁵ function of linguistic demagoguery stands out in the first place. These are cases in which rude, scathing and inappropriate verbal attacks are responded to in diametrically different ways - with a gentle tone and a smile while saying, "I love you very much, *too*!" („И аз много те обичам!“) which apparently is not having anything to do with the situation. This stark example of linguistic demagoguery is enhanced by the reversal of dialogue, the unexpectedness of the line bordering on irony and even sarcasm. Here the conjunction "too" (Bg „и“) is used in order to divert attention from the verbal attacks, and at the same time to emphasize the hidden *perlocutionary*⁶ meaning (ibid.) - to make the addressee of the rude and reprehensible remarks think, realize their mistake, correct their behaviour and even apologize.

Compared to the pure lie, linguistic demagoguery is definitely a more complex phenomenon, as it involves various "traces" of other subconcepts of the metaconcept *lie* (as mentioned above). In addition, its pragmatic nature is particularly characteristic of it - linguistic demagoguery is always applied to achieve a certain goal. Very often it is used to improve the speaker's own image and increase their influence on others, to suggest a certain form of behaviour or to provoke one or another action.

Linguistic demagoguery is expressed not only through those small, inconspicuous words in a text, about which St. Dimitrova wrote in her monograph (some of which have been mentioned above) and which are charged with particularly strong effects in the various discourses. Folklore abounds with paremias objectifying linguistic demagoguery. In delicate situations, when a certain form of behaviour must be suggested, in cases where, for example, someone has to be made to do something without straining the situation, and even in order to soften it, the Bulgarian paremia with high *semantic density*⁷ is used; the description of its meaning is "I'm telling you, daughter, call to your mind, daughter-in-

⁵ **Illocution** - the use of an utterance to achieve a specific goal. [10]

⁶ **Perlocution** - a term from the Theory of Speech Acts, created in the middle of the twentieth century by the English logician John Austin and the American scientists John Searle and Herbert Grice. The term **perlocution coincides with the concept of speech impact** - the speech effect on the feelings, thoughts, and actions of the addressee. They note for the first time that speech can not only convey certain information, but it can be accompanied by many other actions (congratulations, persuasion, warning, etc.). In addition, they formulated the principles and postulates that guarantee the success of a particular speech act and speech communication in general. The model of the speech act initially includes *locution* - speaking, *illocution* - communicative speech action with various orientations (message, question, request, order, etc.). and *perlocution* - a speech effect on the feelings, thoughts, and actions of the addressee.

⁷ **Semantic density** in linguistics shows the *degree of frequency* with which a given phrase / expression / paremia is used *with a certain meaning* in each language.

⁴ **Paremia** – from Greek *παροιμία* - proverb, saying, parable. **Paremiology** - the science that studies proverbs and sayings.

law!"⁸ (Bg „Казвам ти дъще, сещай се, снахо!“; variants „Думам ти дъще, сещай се, снахо!“ и „Тебе думам, дъще, усецвай се, снахо!“). The wise author of such paremiological units - the people - puts a lot of reason and insight into them with the intention of making a remark in a roundabout way or giving advice on the implementation of a particular activity, so as not to complicate relations between interlocutors. The a priori meaning of paremia is related to the observation from practice that it is easier to make a remark to a close person than to a stranger or even an indirect relative. On the other hand, the achievement of the desired result is unequivocally dependent on the way in which the remark is presented. In fact, John Austin's theory of speech acts [11] is valid here: illocutionary and perlocutionary⁹ effects, in this case the perlocutionary act is essential - in a roundabout or delicate way to make a person do something specific that the addressee has had in mind.

This kind of linguistic demagoguery is also reflected in another Bulgarian proverb "Hit the saddle, expect the donkey to call to its mind" (Bg „Ударй самара, да се сети магарето“, „Удрй самара, за да се сети магарето“, „Бий самара, да се сети магарето“). The imperfect form of the verbs in the Bulgarian proverb and its variants shows the categoricalness of permanent need (and not once) to apply indirect methods and approaches to be able to perform an activity without interpersonal tension. Linguistic demagoguery here is evident even through allegory, as in all other cases of personification, so characteristic of the paremiological genre, when some quality of an animal introduced into folklore as a substitute for conventionally perceived human quality is exposed. Linguistic demagoguery in this case is transmitted metaphorically by shifting the focus from the person in charge of a job to be done (who is undisguisedly and preventively reminded of what to do) to a loaded donkey, to which a certain way of behaviour is suggested by hitting its saddle. This shift of the subject in similar situations in the animal and human world has a persuasive effect and thanks to it the perlocution of speech is emphasized.

Semantically close to life situations, suggesting a certain way of behaviour are the cases when through linguistic

demagoguery one or another specific action is appealed to. Such is the paremia "Let's go to your place to drink, and to mine - to sing" (Bg „Да идем у вас да пием, а у нас - да пеем“), in which behind the parallelism and rhyme in Bulgarian language one can make out hidden negatively tinted from the axiological point of view features (subconcepts to the metaconcept *lie*) *craftiness* and *milking*. The Bulgarian paremia "He takes you across the sea so that water doesn't come to your mind" (Bg „Прекарва те през морето да ти не дойде на ум за вода“) veils the intertwining of craftiness and resourcefulness with demagoguery: the vast sea, the expanse of water as a symbol of abundance of water and the need for water, not salty, but freshwater needed for physical survival.

Linguistic demagoguery in most cases is inter-woven with craftiness because of pragmatism as well, as in the paremia recommending a survival model: "If you are hungry, ask for water." (Bg „Ако си гладен, вода искай“). If you follow this life advice, you will gain a double benefit - you will get not only food because you are hungry, but also water, because of the applied linguistic demagoguery to ask for something harmless, which is usually not worth money - water - and due to regret or coincidence of circumstances to receive food as well. The paremia "If you spit blood, say I have eaten dogwood" (Bg „Ако плюеш кръв, казвай дренки съм ял“) has the same syntactic structure and strong perlocutionary charge. In this case, the pragmatism of linguistic demagoguery, provoking a certain action, relates to its another aspect - striving to improve one's own image. In many cases, this aspiration is backed by a large dose of boasting, provoking a negative axiological reaction, as in the proverb saying, "Great boasting, but little works/results" (Bg „Големи хвалби, ама малки творби“ и „Големи хвалби, а малки торби“). There are many stylistic and other linguistic means that suggest a negative attitude towards bragging and people who want to present themselves in the best light in words - using rhyme, antithesis, syntactic parallelism, built on an opposition (En „but“; Bg „ама/ а“).

All the listed linguistic means help to create linguistic demagoguery, which is based on the opposition of great boasting in immodest emphasis on dubious merits and merits against the background of insignificant results. The second proverb implicitly includes irony in opposing high expectations in the pursuit of improving one's own image and the actual insignificant mercantile results. Thus, irony acquires the role of a significant factor in the illocutionary act.

A high degree of irony, even sarcasm, is set out in the paremia "The fox that can't reach the grapes, says it's sour", originated in Aesop's fable called "The Fox and the Grapes". This Aesopian precedent¹⁰ for many ethnic groups text contains linguistic demagoguery for those cases when our efforts to improve our own image have not yielded results and the paremia is mentioned both for our own complacency and

⁸ Exact correspondences of paremias in different languages are relatively rare. Therefore, here and in the following paremiological units it is impossible to expect their exact translation; in order to clarify the relation between their semantics and their different functions according to the theory of speech acts, a semantic "translation" (interpretation of the meaning) of the proverbs will be presented for the purposes of the research. The Bulgarian proverb will be quoted in brackets, as well as its variants, if any.

⁹ An *illocutionary act* - (illocution, Latin *il* - "in, inside") - provides an indication not only of the meaning of the sentence expressed, but also of the communicative purpose of this statement.

Perlocutionary act (perlocution, lat. *Per-* 'through') - serves to deliberately influence the addressee, achieving a certain goal.

¹⁰ **Precedent** - (from the Latin *praesedens* (*praesedentis*) - "preceding"). A text or name well known to a linguistic person and their "wide environment, including predecessors and contemporaries" (Yu. N. Karaulov). [12]

for distraction from a certain failure and preservation, not damaging of the good reputation gained so far.

Linguistic demagoguery is particularly pronounced in precedent texts such as proverbs and sayings (collective name: paremias), which act as a mediator in similar cases. It is no coincidence that the American researcher S. Winick defines them as "*an instance of communication*" and "*strategic action*" [13]. In this regard, we believe that paremias are *one of the oldest and proven means of communication strategies to suggest a certain type of behaviour*: through some linguistic demagoguery embedded in them a certain message and pattern of behavior is being conveyed, thus implicitly a strategy for specific action is outlined.

Because of this "introduced pragmatics" of paremias in the communicative act, the famous American philosopher and literary critic Kenneth Burke regards them as a "*strategy for encompassing situations*" [14] and considers them as a *creative way to dealing with situations* and their inherent problems. This characteristic feature of paremias is the basis of the researched communication strategies implemented in language demagoguery.

IV. CONCLUSIONS

Demagogy, applied in the early period of Athenian democracy to gain power in the demos management and / or for personal gain, is now being functionally upgraded and includes language demagoguery as a communication strategy in various national cultures.

The analysis of the etymological and semantic characteristics of the terms *demagogy* and *linguistic demagoguery* - the subject of this study, proves that the hyperonym "demagogy" and the hyponym "linguistic demagoguery" are two reversibly related terms. Demagogy is most often used to achieve political goals and in advertising, regardless of whether for commercial or personal gains. Demagogy implicitly includes in its semantics and functional use the usage of linguistic demagoguery - through various stylistic and other linguistic means to deceive the audience in most cases for selfish purposes or to improve the speaker's personal image and strengthen their influence on others. The hyperonym of the dyad in question uses the oratorical and polemical means of linguistic demagoguery, including even the use of "small words of great importance" [9], irony and sarcasm in the speech and / or speaker's intonation as stylistic means, the use of the rich phraseological and paremiological fund in each language.

All these communication strategies, applied to enhance the impact of speech, serve to implement demagogy through emotional rhetoric and propaganda aimed at the prejudices, feelings and hopes of the audience. The two phenomena under consideration are in a relationship of symbiosis and synergy - they complement each other, as linguistic demagoguery builds on the hyperonym *demagogy* because of the inherent word power, which has always been a tool for influence, persuasion, and manipulation (the latter ones being the essence of demagogy).

The examples analyzed in the study give us reason to conclude that there is a *close relationship between demagogy and linguistic demagoguery with leadership* - political and institutional, based on the communication strategies for impact underpinning them.

Special emphasis is placed on the *perlocutionary function of language demagoguery*, which is also relied on by fake news, implicitly including demagogy, disinformation, and propaganda [15] in its functional characteristics and based on the speech impact as a type of social impact and relying on the effect that fake news through the described communication strategies affect the emotions and actions of the recipients.

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The Role of the Human Resources When Providing Telecommunication Services

Ivaylo Stoyanov¹ and Gergana Dimcheva²

Abstract – The article highlights the importance of the account manager in the providing of telecommunications services. The main professional and personal competencies of an account manager in servicing business customers of telecommunication services are outlined. They are summarized in three main directions, affecting the stages in the provision of telecommunication services: Planning and creation of new services for business customers (pre-sale of telecommunication services); Provision and operation of telecommunication services to business customers; After sales of telecommunication services to business customers.

Keywords – human resources, competences, account manager, telecommunication services.

I. INTRODUCTION

The main power for the development of a certain country is the telecommunication field. This was especially proven during the pandemic of COVID-19, when businesses, education and healthcare moved in digital environment.

The digitalization of the business has turned out to be a constant process which depicts changes in the environment, as well as points out the strive of more and more companies from different sectors of the economy to improve, to be competitive, to not be afraid of the changes and to experiment. This comes in all sectors of the economy and challenges the business organizations, including the telecommunication companies.

Despite the rapid development of the technologies, the processes in every telecommunication company would not be executed successfully without the participation of the human resources. Their knowledge and skills are needed not only for these processes which are in the organization, but out of it as well, especially when building up and maintaining relationships with different clients.

II. THE ROLE OF HUMAN RESOURCES IN THE SERVICE FIELD

The key factor which influences the strategic development of every branch of the national economy is the human's intellect, the social-economical effectiveness of creating human capital and the factors which influences the national society. [1]

In the sphere of the services, the fast changes which occur

during the activities of the organizations are a result of the dynamic technological development, which enforces constant improvement of the human resources.

According to authors, in order to provide or execute a high quality service, the preparation and the qualification of the employees of the organization is with main importance, because "if a low quality material product could eventually be substituted, the low quality service would not be repeated with the same kind" [2]. The service provider themselves finds difficulties when improving the quality of the service, as well as the consumer finds difficulties to rate them.

The unstable quality of the services comes from their changeability, due to the dependence on who, when, how and where the service is provided. [3] Not always the employees do the services equally. There could be a difference between the same exact service in a certain organization and a difference in the services which one employee offers to the customers, therefore the clients receive the same service but with different quality. This could be hard for standardizing and controlling. This leads to individualizing of the services in order to satisfy the specific needs [2, 4].

The process of services is above all personal and therefore relies on the physical and mental state of the executor [5].

In this regard, according to one of the main steps to quality control is the employment of suitable staff and the constant education, according to the constant changes in the technology and the needs of the customers [3].

In this regard, another author *finds the proper staff management obligatory*, as well as the constant "education, improvement and motivation" from one side and "creating a comfort environment for the customers, using their knowledge and competences, related to the process of providing the service" from other [6]. This causes the problem for the full dependance of their quality from the people's work, who execute it [7]. Adaptation is required according to the individual needs of every client [8] and/or adaptation to the specific needs' customers. This leads to their personification.

The behavior of the employees in a vast extend effects the quality of the service [8]. Some of the characteristics of this behavior are:

- Competence for solving problems and optimization of the process of providing services;
- Politeness in communication with consumers and suppliers;
- Accessibility to ensure the expectations and desires of user;
- Reliability, accuracy, honesty and security in compliance with obligations, etc. [9].

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III. THE ROLE OF THE HUMAN RESOURCES WHEN PROVIDING TELECOMMUNICATION SERVICES

A main commitment of telecommunication service providers is to provide their customers with a variety of high-quality services. This is achieved with the help of the existing human resources, infrastructure and working environment, which is also part of the strategy of telecommunications operators. They face three main tasks:

- (1) To differentiate the offer;
- (2) To manage the quality of services so that they meet or exceed customer expectations;
- (3) To increase labor productivity, through various forms of motivation of human resources, making them work more skillfully, to introduce new solutions for products/services by designing better service.

The competence, experience and in-depth knowledge of all involved in the field of telecommunications, combined with technical knowledge in detail, ensure high productivity and efficiency. [10, 11, 12]

The managers of telecommunications companies must build an environment that encourages team creativity, find effective and efficient ways to integrate business processes and technology. To manage a process, the first task is to define it. This includes defining the steps (tasks) in the process and defining the tasks of the people and their role involved in the process. Once the process is outlined and implemented, performance measures can be established [11,12,13,14]

The providing of telecommunication services requires necessary professional / specific and personal qualities of the persons engaged in this. These persons are known as so-called "account managers"¹ [15].

Many business processes in telecommunications companies depend on the correct actions of the account manager.

Unlike only 15 years ago, for example, users of telecommunications services, especially business users, are becoming increasingly demanding about the services they receive. Attracting new users is very difficult, but not least, more work is their retention. These two main functions are performed by the account manager. It represents the relationship between the customer and the telecommunications company. Every company strives to retain its existing customers by building and strengthening long-term cooperation with them, i.e. by turning them into loyal ones. Special attention is paid to customer relationships in customer relationship management and customer satisfaction analysis. This is achieved by providing highly qualified and motivated personnel and creating appropriate conditions for their continuous improvement.

An account manager has multiple roles. He must be able to know well the process of purchase and operation of his customers: price, conditions, capacity, threats to the proper functioning, possible problems and alternatives to overcome them.

It is important to know who, who is in the buying process, to predict who can block and make the work difficult [16]. That is why special attention should be paid to the quality of service to each customer, because it is the most significant factor in making a purchase decision. [17, 18].

In the specialized literature, the question of the necessary competences in the processes of providing telecommunication services has been discussed.

The proposed competencies for an account manager in servicing business clients of telecommunication services are summarized in three main directions, affecting the stages in the provision of telecommunication services: *Planning and creation of new services for business customers (pre-sale of telecommunications services); Providing and operation of telecommunication services to business customers; After-sales of telecommunications services to business customers (Fig. 1)*².

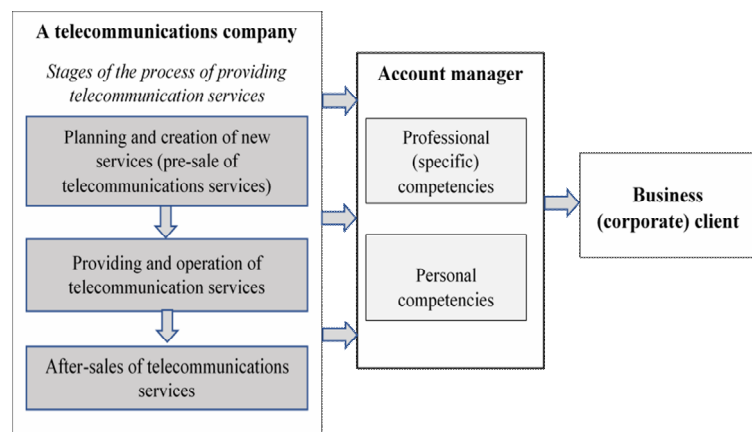


Fig 1. Necessary professional and personal competencies of the "account manager" when providing telecommunication services to business customers

A. Stage 1. Planning and creation of new services (pre-sale of telecommunication services)

Professional competencies:

✓ *Analyzing the client's requirements* – analyzing the information received from the business client; identification (determination) of a given product or service according to the client's requirements and research of possibilities; preparation of technical specifications of the product or service; performing a cost/benefit analysis; determining the resources needed to provide the required products/services;

✓ *Researching the market and focusing on the development of a given product from a marketing point of view* - characterizing the activity of the telecommunications market; analyzing the competition and conducting research on comparative products or services; identifying business opportunities and market trends; knowing the advantages of

¹ www.itil.org.uk According to good practice, his role is very similar to that of a business manager, but includes more commercial aspects.

² Some of the competencies are present in the two / three stages

the company's products and services and being able to highlight them;

✓ *Application of technological knowledge for the telecommunications market* - analyzing the physical and technological characteristics of different types of networks and configurations in accordance with the client's requirements for providing the product or service; familiarization with the characteristics of telecommunication equipment in accordance with the requirements of the client;

✓ *Planning the implementation of the project to create a new service* - introduction of the project team; development of the production schedules and determination of the stages in the implementation of the project; consulting the interested participants, setting goals, developing a marketing strategy.

Personal competencies:

✓ *Communication in the workplace* - teamwork skills; resolution of conflict situations; negotiating agreements; skills for working with people from different backgrounds and departments; self-organization and organization of others to achieve high results

✓ *Organizational skills and information management* - determining the strategic nature of the transmitted information; skills for structuring the necessary information; correct implementation of the document flow; allocating effort, time and other resources to achieve goals; offering optimization of processes and activities;

✓ *Communication with the client* - openness, business negotiation skills; advising clients on pre-sales; making presentations to client teams and senior management (especially when it comes to a corporate/strategic client); concluding deals as a result of positive business meetings; analyzing prices, discounts, products, benefits and losses for the company and for the client, to reach an optimal business solution; creating mutual trust by using an individual approach in the provision of services and showing genuine interest.

B. Stage 2. Providing and operation of telecommunication services

Professional competencies:

✓ *Provision of technical assistance if necessary* - in the event of technical problems (interruption of the network); provision of unique and complex business solutions with practical application of new technologies;

✓ *Application of problem solving methods* - problem identification; analyzing the situation; finding solutions; choosing the optimal solution; corrective action planning; execution of the plan;

✓ *Presentation and sale of solution(s) developed for business clients* - identification of decision-makers and other influential persons; developing stable long-term relationships or partnerships with them.

Personal competencies:

✓ *Communication in the workplace* - teamwork skills; resolution of conflict situations; skills for working with people from different backgrounds and departments; self-organization and organization of others to achieve high results;

✓ *Communicating with the client* - consulting clients; development and maintenance of good relations with clients; maintaining trust with the client by regularly checking the status of the commercial relationship and giving feedback on the progress of its implementation;

✓ *Quick adaptation to change* - study of innovative strategies for the implementation of solutions; showing interest in challenges, changes and new situations; interest in and application of technological innovations and solutions in the telecommunications market in their work.

C. Stage 3. After-sales of telecommunications services

Professional competencies:

✓ *Application of problem solving methods* - problem identification and situation analysis; planning of corrective actions and elimination of the problem that has arisen;

✓ *Informing the client* - informing the client about the work being carried out in connection with the problems that have arisen, as well as notifying him of additional costs, if any; ensuring that the customer has all the information necessary to properly use the services and equipment; development of loyalty programs; timely informing the client about new functionalities to the existing services or opportunities to include new ones; regular review of existing customer profiles with an updated assessment of their potential and needs;

✓ *Preparation of forecast for network load and its management* - development of prognostic assessment of the network, and analysis of technical specifications and parameters for implementation in the network of services offered to customers; assessment of needs in terms of required equipment; issuing recommendations for the development of network infrastructures; development of action plans aimed at increasing the profitability of infrastructure operation; tracking the timeliness of invoice payments, debt prevention; building customer profiles, by evaluating customer potential after researching the customer's business and using this information to sell the right product or service at the right time.

Personal competencies:

✓ *Communication in the workplace* - ability to work in a team, ability to switch between different tasks (in several projects at different levels of development with different business clients) resistance to stress; organizes himself and others to achieve high results;

✓ *Communication with the customer* - proactive provision of after-sales service, to retain customers;

maintaining trust with the client by regularly checking the status of the commercial relationship and providing feedback on the progress of its implementation;

✓ *Quick adaptation to change* - showing interest in challenges, changes and new situations; suggesting new ideas or ways to improve products or services; ability to cope with stress.

Many business processes in the company depend on the correct actions of the account manager. This is due to the fact that, in the course of his duties, he contacts not only the client, but also other support departments and specialists within the organization, and sometimes outside it.

Possession by an account manager of specific knowledge and skills, combined with personal competencies and behavior are mandatory in each of the stages in the provision of telecommunication services. This arises from the need not only for making decisions of a strategic nature, arising from the specific needs and requirements of each individual client, but also for the correct running of business processes in each telecommunications company.

The main tasks of the account manager are - satisfying the wishes of the client and adapting the work of all departments of the company in accordance with them.

The proper management of human resources in the telecommunications industry is not possible without investment and innovation support, which is the driving force for attracting a highly professional, purposeful and competently trained workforce that will ensure the strategic development of the telecommunications industry [1].

After the announcement of the COVID-19 pandemic worldwide, the question of working in a digital environment is becoming more and more relevant. This is directly related to digital customer service, which affects the various sectors of the economy. This form of service will be increasingly preferred because of the greater convenience, speed and accessibility from any point. [20, 21, 22, 23].

IV. CONCLUSION

The ever-growing demands of users for speed and quality of mobile services, as well as their satisfaction, lead to convergence of technologies, hybridization of offered services, unification of standards for data transfer, voice, image. These high customer demands and claims are also satisfied with the help of competent and well-prepared specialists. The lack of the necessary professional and personal competencies of an account manager leads, on the one hand, to failure to meet the specific needs of a given business client, and on the other hand, to a decrease in the company's revenues.

Each business customer must be thoroughly analyzed in relation to their individual requirements and needs in the use of telecommunication services, according to which requirements the appropriate account manager should be appointed.

The dynamic development of mobile operators poses new challenges for the management to look for new, flexible solutions in serving their business customers.

The account manager is the specialist who is assigned to take into account dozens of factors influencing the service market, constantly matching the need for consumption and the quantity thereof, and let's not forget that these are constantly changing quantities.

The account manager is one of the basic building blocks for any telecommunications operator and its selection should be as detailed as the selection of the subject of the operator's activity.

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Emergence of Viral Business Processes

Victor Gladchenko¹

Abstract – The presence of viral business processes in almost every organization and company makes their review an extremely topical issue.

The purpose of the article is to consider the factors that lead to the emergence of viral processes in organisations.

Keywords – viral business process, business process analysis, stages of business process analysis, monitoring, description.

I. TOPICALITY OF THE PROBLEM

The author's research over the past year has shown two interesting features of the viral business processes:

- Their ubiquity—there is almost no organization in which viral business processes do not exist.
- They can be both useful and extremely harmful to the organization's business process system.

It is their dual nature that justifies the topicality of the problem.

- The scale of their impact on an individual organization runs the gamut and ranges from insignificant to enormous. The author's research shows the distribution of the value of their impact within the normal distribution/allocation (the so called bell curve)
- The vector of their impact- from positive (i.e. useful, in the direction of optimization of the organization's business processes) to negative (negative consequences for the organization's business process system)- is more often in the negative spectrum

The dual nature of scale and impact makes the economic effect of their impact potentially very serious and dangerous for the organization, including it can lead to a fatal outcome i.e bankruptcy.

II. ESSENCE OF THE PROBLEM

Viral business processes are still a relatively poorly studied and examined phenomenon. Until recently they were not even defined as a separate phenomenon in the business process analysis.

Also they manifest themselves quite discreetly in the system of business processes of the organization- they do not have strongly expressed symptoms that are clearly distinguished i.e. their signs are difficult to notice and this can be done only by a targeted research on behalf of a specialist.

The factor of unexpectedness also plays its role-almost every organization/company that meets ISO standards does not expect the emergence of viral business processes.

This statement is the result of research by the author that took place over the last two years (2020, 2021).

The research is of a survey type with 40 participants, experts from the following target groups:

- business process analysts consultants;
- business process analysts with a permanent position in a company/organization;
- heads/chiefs of departments of ISO certified organisations/companies;
- managers of ISO certified organisations/companies.

The survey includes 2 close-ended questions:

- "Do you think that there are viral business processes in your company/organization?"
- "If you answered yes to the previous question, indicate in which department and/or hierarchical level do you expect them to have occurred". This question may have more than one answer.)

The research methodology includes several stages:

- First stage- participants are given a short lecture on the topic "Viral business processes"
- Second stage- they were asked 2 closed questions.
- Third stage- a statistical analysis of the research results was made.

The results of the study are as follows:

- Managers of companies/organisations in general (more than 75% of managers asked) do not expect viral business processes to exist, but if they do exist, (in their opinion) they should be almost in all departments of the company/organization except among the middle and senior management.
- Heads/ chiefs of departments (more than 90% of respondents) do not expect viral business processes to exist in their department.
- Business process analysts with a permanent job in a given company/organization do not expect (more than 90%) of viral business processes to exist in it (at least not after their appointment).
- Business process analysts consultants (almost 100% of those asked) expect viral business processes in every organization, especially in logistics, administration and IT departments.

Another interesting result of the research is in which departments/hierarchical levels the viral business processes are expected to exist:

- First (with more than 50% of respondents) is the IT department.
- Second (with almost 40% of the respondents) are purely administrative departments.

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- Third (with exactly 35% of the respondents) is the middle management.
- The other departments/hierarchical levels have almost equal results.

The combination of unfamiliarity, discretion and unexpectedness makes viral business processes almost “invisible” to companies/organisations.

According to the author of the article, the solution is to pay attention to the conditions for the emergence of viral business processes in order to reduce their discretion and unexpectedness.

III. AUTHORSHIP OF VIRUS BUSINESS PROCESSES

The emergence of viral business processes is subject to certain rules:

- They do not appear independently- they always have an “author”.
- Redistribute resources to already existing business processes.
- Change the functioning of the existing system of business processes of the company/organization.

Authorship

Viral business processes always appear as a result of the actions/inactions of an employee of the company/organization, i.e. there is a human factor.

This makes it possible to examine the motives of the likely employee of the company/organization who would initiate the emergence of viral business processes.

The author surveyed fellow business process analysts on the “author’s” motives.

The research is of a survey type with 20 participants, experts from the following targeted groups.

- business process analysts consultants;
- Business process analysts with a permanent position in a given company/organization.

The survey includes 2 closed-ended questions:

- “What do you think could be the motivation of the “authors” of viral business processes in your company/organization?”
- “Do motives change according to the position of the “author” of the viral business processes in the hierarchical structure of the company/organization?”

The research methodology includes several stages:

- First stage- the participants were given a short lecture on the topic “Viral Business Processes”.
- Second stage- they were asked 2 closed questions.
- Third stage- a statistical analysis of the research results was made.

The results of the study are as follows:

- Business process analysts with a permanent job in a given company/organization in general (about 80%) point to “hidden resistance”, “lack of motivation to work”, “laziness” as leading motives.
- The majority of business process analysts consultants (almost 70% of those asked) indicate “active

resistance”, “hidden resistance”, “hidden optimization” as leading motives.

Another interesting result of the research is in which departments/hierarchical levels the “authors” of the viral business processes are expected to be located:

- About 83% of business process analysts with a permanent job in a given company/organization believe that the “authors” of viral business processes are mainly in low hierarchical positions (unqualified general staff, expert staff without managerial positions).
- An extremely large part of business process analysts consultants (more than 90% of the respondents) believe that “authors” of viral business processes can be found in all hierarchical positions except for the top management level.

According to the results of the research, the motives could be divided into several groups:

- optimization (hidden optimization);
- open resistance;
- hidden resistance;
- lack of work motivation (unwillingness to work);
- laziness.

First group-optimization motive

In this case, the “author” aims to ease his work without harming the company/organization. The “authors” of viral business processes with this motive could be anywhere in the hierarchical structure of the company/organization.

This motive is the most favourable for the system of business processes in the company/organization, because as a result of it very often, more optimized processes appear.

The only potentially unpleasant moment is the fact that when a business process changes, very often there are chain process reactions that affect the processes close to it, which can in turn lead to negative changes in the system of business processes of the company/organization-i.e. whenever a viral business process is identified it needs to be modelled (see Viral Business Processes Modelling, Victor Gladchenko, TIEM conference 2022).

Second group-open resistance

In this case, the “author” openly resists changes/innovations that have occurred in the company/organization (another form of so-called resistance).

In this case, the “authors” of viral business processes possess at least 2 of the following 4 characteristics:

- long-term employees;
- expert staff, often with managerial functions;
- average or higher motivation;
- above 40 years old.

In this case the “author” believes that the changes/innovations that have occurred are not of a positive nature- i.e. do not really optimize the business processes of the companies/organization or could harm them personally in some way.

The form of resistance of the “authors” of this type of viral business processes can be formulated as follows:

- First option- their adherence to an older, outdated version of the given business process, which in itself is creating a viral business process.
- Development of their own business process, which they consider more optimal for the organization/company.

Result- in about 40% of the cases, the viral business process could be of some benefit to the company/organization.

Third group- hidden resistance

Again, in this case, the “author” resists changes/innovations that have occurred in the company/organization (one of the forms of the so-called resistance).

In this case, the “authors” of viral business processes possess at least 2 of the following 3 characteristics:

- long-term employees;
- low or medium motivation;
- above 50 years old.

In this case, the “author” believes that the changes/innovations that have occurred are not of a positive nature for them and/or for the business processes in which they participate.

The form of resistance of the “authors” of this type of viral business processes can be formulated as follows:

- Adherence to an older outdated version of the given business process, which in itself is creating a viral business process.
- Developing a viral business process to ease their work, but is irrelevant to the outcome for the business process system of the company/organization.

This type of “authors” of the viral business processes do not care what the consequences of their actions/inactions are for the business process system of the company/organization.

Fourth group- lack of work motivation

Another case of resistance to changes/innovations that have occurred in the company/organization (another form of so-called resistance).

In this case, the “authors” of viral business processes possess at least 2 of the following 3 characteristics:

- long-term employees;
- low motivation;
- weak mental stability;
- employees of departments with a high innovation intensity for a long period of time.

Many of the employees who fall into this category are mentally and intellectually tired of change, which makes them biased (in some cases even aggressive) towards any innovation.

In most cases, this type of “authors” of viral business processes are not alone, i.e. they are members of a group with low work motivation (often in one of the preceding phases of the so-called burnout), who wish at all costs to lighten their workload without caring about:

- the achievement of any qualitative and quantitative results;

- the consequences for the system of business processes of the organization.

The result is that in about 16-17% of the cases, the viral business process could be of some benefit to the company/organization.

Fifth group- laziness

With the “authors” of this group, we cannot speak about any conscious form of resistance to changes/innovations that have occurred in the company/organization.

In this case, the “authors” of viral business processes possess at least 2 of the following 3 characteristics:

- young employees;
- low motivation;
- high mental resistance to any external influences.

Often this type of “authors” of viral business processes want at all costs to reduce the amount of work they put in- they are not interested in any consequences, including the organisation’s business process system.

An extremely accurate characteristic for this type of “authors” of viral business processes is the “simulation” of activity, i.e. they seem to perform some actions/business processes that lead to low or zero results. This unique characteristics of theirs makes it difficult to identify both this type of “authors” and the viral business processes they create.

Result- in less than 5% of the cases of the viral business process which is developed by this type of “authors” could be of any benefit to the company/organization. Their suspension from the company/organization is recommended.

IV. CONCLUSION

Studying the motivations that drive the “authors” of viral business processes are key to locating, identifying and modelling the viral business processes and their influence upon the business process system of the company/organization.

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Cross Framework for Knowledge Based Decisions in Business Model Innovations

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Abstract – This article presents theory of some of ecosystems and the knowledge processes associated with the various phases of ecosystem lifecycle. Author suggests cross framework for knowledge based decisions in business model innovations. It presents what knowledge processes are involved in the birth, expansion, leadership, and renewal phases of a business ecosystem, and how are these processes linked together to shape its lifecycle. The framework links knowledge fields necessary to innovate and business model improvement. Furthermore, this research makes an important contribution by providing a starting point of future research through the integration of knowledge management in the conception of business models.

Keywords – Knowledge, Ecosystem, Business Model Innovation, Ecosystem life cycle, Knowledge Based Decision.

I. INTRODUCTION

If the development of a business ecosystem is like innovation process, it requires members to have mastered skills and competencies required for the realization of knowledge-intensive tasks and activities. These skills and competencies comprise a firm's innovation capacity. According to some authors [17] a company's innovation capacity is comprised of these organizational abilities. They correspond to different phases of the innovation process: (1) the ability to identify and assess on market opportunities during the ideation stage of the invention phase; (2) the ability to recognize the value creation potential of external resources, assimilate these resources, and apply them for commercial purposes during the conceptualization and translation stages of the invention phase; (3) the ability to develop new markets for innovative products and services during the commercialization phase of the innovation process.

In recognizing knowledge as a new resource in gaining organizational competitiveness, knowledge management suggests methods in managing and applying knowledge for improving organizational performance. Much knowledge management research has focused on identifying, storing, and disseminating process related knowledge in an organized manner. Knowledge management can be defined as uncovering and managing various levels of knowledge from individuals, teams, and organizations to improve performance [4, 10]. Applying knowledge to decision making has a

significant impact on organizational performance than solely processing transactions for knowledge management. In the sense of innovations, all decisions are based on knowledge. Author of the paper suggests a cross framework for knowledge based decisions in business model innovation.

II. THEORETICAL FINDINGS

A. Knowledge

There is no standard definition regarding all that stands for knowledge. It generally refers to a set of organizational practices and ways of generating, ways of capture and dissemination of the necessary knowledge to achieve objectives of the organization. Nonaka and Takeuchi start with development of a spiral model of generating the organizational knowledge [10, 12]. It is a two- dimensional model using as a reference system the epistemological axis and the ontological axis. On the epistemological axis there are two categories of knowledge: explicit knowledge and tacit knowledge. On the ontological axis there are three categories of knowledge: individual, team and organizational [10, 12]. According to other authors [11], knowledge is created in a knowledge platform emerged in individuals, working groups, project teams, informal circles, temporary meetings, e-mail groups, and at the frontline contact with the customer. According to them, two typical forms of knowledge are created and shared among organizational members. Explicit knowledge is a type of knowledge, which can be formed and expressed as data, scientific formula, specifications, manuals etc. Tacit (implicit) knowledge is another type, which is highly personal and hard to formalize like subjective insights, intuitions, and hunches. The conception of knowledge is developed beyond, toward Triple helix of the organizational knowledge. It is a complex metaphor using the thermodynamics principles. It could be said that the organizational knowledge is composed of three different fields: cognitive knowledge, emotional knowledge, and spiritual knowledge. These fields are non- uniform, non-homogeneous and they interact in a dynamic way. Cognitive field contains knowledge about what is. Emotional field contains knowledge about how we feel. Spiritual field contains knowledge about people's aspirations and life values [2]

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B. Business Model Innovation and Knowledge Transfer

The importance of business model innovation increases every day. Product and process innovations are no more the only source of innovation. System innovations emerge. Business model as system become the basis of new age innovations- business model innovations.

In the literature business model innovation defines as “about creating fundamentally new kinds of businesses, or about bringing more strategic variety into the businesses you are already in – the kind of variety that is highly valued by the customers” [14]. According to The St. Gallen Business Model Navigator, innovations in business models must be radical and must include at least two of dimensions (four central dimensions: the Who, the What, the How, and the Value.).

There is discussion about number of reinvented business model elements (dimensions) and the level of disruptiveness of innovation [7, 8, 14].

Finally, every dimension should be seen as a potential possibility of innovation and should be innovated with the thinking of how the redesigned element is able to create value.

From the other side we must have in mind external knowledge transfer as a source of business model innovation. Table I shows types of innovation dependence of the intensity of knowledge transfer.

TABLE I

INTENSITY OF KNOWLEDGE TRANSFER FOR BUSINESS MODEL INNOVATION [13]

<i>Different Types of Business Model Innovation (BMI)</i>		
<i>Type I</i>	<i>Type II</i>	<i>Type III</i>
- low intensity of external knowledge transfer - no direct interaction with partners - incremental BMI	- exchange of information, knowledge, and ideas - partners within a network - learning from each other	- long lasting and intensive knowledge transfer - partners within a network - radical business models
<i>Low</i>	<i>Medium</i>	<i>High</i>
<i>Intensity of Knowledge Transfer</i>		

The first type of business model innovations (Type I) is defined as a form of organizational change with nearly no collaboration with customers and external partners. There is low intensity of external knowledge transfer. Changes of the business model are done without direct interaction and leads to incremental business model innovations.

The second type of business model innovations (Type II) is characterized with mutual learning for both – the innovating company and the partner. Partner companies take part in transfer knowledge and give input for improving the business model, but it doesn't induce innovations in their business models. Basic company expand only its research network.

The third type of business model innovation (Type III) is characterized with intensive knowledge transfer from partners. This leads to different forms of partnerships. The innovative changes are based on input and ideas from all partners and finally all of them should take their advantage from the innovation efforts. This high intensity of knowledge transfer can lead to radical business models, which are new for the whole branch. This intensive knowledge based on collaboration may lead to long lasting partnerships, where companies support each other's business and partner organizations bring in business model components to the business model of the firm [13].

C. Knowledge management characteristics

To respond to new challenges in the rapidly changing external environment, modern management needs to use knowledge from various sources [6]. Knowledge generation processes are essential to the development of a business ecosystem. It is a process that helps organizations identify, select, organize, disseminate, and transfer important information and expertise that are part of the organization's memory [16] for the purposes of business model improvement or development.

TABLE II

KNOWLEDGE MANAGEMENT CYCLE [16]

Create knowledge	Knowledge is created as people determine new ways of doing things or develop know-how, or external knowledge is brought in
Capture knowledge	New knowledge must be identified as valuable and be represented in reasonable way
Refine knowledge	New knowledge must be in context so that is actionable
Store knowledge	Useful knowledge must then be stored in a reasonable format in a knowledge repository
Manage knowledge	The knowledge must be kept current. It must be reviewed to verify that is relevant and accurate
Disseminate knowledge	Knowledge must be made available in a useful format to anyone in the organization who need it

D. Knowledge based decision making

The study of decision making has evolved in classical decision making, behavioral, decision research, judgment and decision making, organizational decision making, and more recently naturalist decision making [18].

Organizational decision making concerning innovations is combination between explicit and tacit knowledge depend on employee level in company's hierarchy. Top manager's decisions are strategic, based on experience and collective insights. Strategic knowledge is tacit and spreads on the overall organization. [1]

Knowledge- based decision making is defined as the process of looking at a topic through certain agreed upon criteria. Pertinent background information is gathered and shared with those responsible for making the decision. Then a decision can be made through a motion and vote.

E. Types of ecosystems in business model and ecosystem life cycle

To involve all business model participants (and stakeholders) we need of some framework. Author suggests seven types of ecosystems as follows:

The technology ecosystem is used by most technology companies owns platforms. This type of company is basic organizer. This value creation is shaped around their core business, and most consumer go-to-market movement in the ecosystem tends to align with the company's core technology movement.

The marketplace ecosystem: the marketplace operator organizes and coordinates the brand. The members pay the operator a fee to participate in the marketplace. All brands are present, and the common customers get a more experience because of the marketplace's aggregation of supply.

The scaling ecosystem: all participants in a scaling ecosystem are in the same business and technically could be considered as competitors. They all benefit from working together and create scale and abiding by agreement upon rules of risk and reward. Typically, the members of a scaling ecosystem are jointly organized, often setting up a collectively funded entity to perform the ecosystem functions.

The accretive ecosystem is typical arrangement between two, or just a few, entities, where all parties have a part of an overall customer value proposition. In the accretive ecosystem, the members generally do not compete.

The cooperative ecosystem: Ray Noorda, the former CEO of Novell create the term "coopetition". This means that competitors cooperate to create higher customer value.

The value chain ecosystem: In this sense, value chains start with original suppliers and ends with consumers of goods and services. They include many participants across many different role types. The participants in the value chain all manage their pieces. There is an organizer at the center of a value chain, which optimize the overall efficiency of the collective participants. He takes a naturally occurring group of related parties and creates a business ecosystem in which the ultimate end customers get better value from the collection of participants. The participants are more effective managing risks together.

The integrator ecosystem: "ecosystem integrator," brings together a bespoke set of ecosystem participants to create a fully integrated end-to-end solution for customers. He takes full responsibility for the operation of the solution delivered to the customer, rapidly assembling, and integrating it, creating a quasi-custom value proposition combined with a contract. All participants have their own brands present in the value proposition, but the end customer has the choice to contract only with the ecosystem integrator or to contract with him and other ecosystem participants.

Depend on type of ecosystem different sources of knowledge could be extracted.

In the literature, four stages of the business ecosystem life-cycle can be distinguished (Table III). During its birth, it is important to go the satisfaction of the customers. In the

expansion stage, the scale potential of the business concept is tested. In the leadership stage, the ecosystem reaches high profitability. The last stage, self-renewal or death is caused by new emerging ecosystems. Moore (1993) observed that the evolutionary stages and the managerial challenges are blurring in business practice.

Furthermore, a business ecosystem is not static. It is subject of a continuous co-evolution process: the complex interplay between competitive and cooperative business strategies.

TABLE III

THE LIFE CYCLE STAGES OF A BUSINESS ECOSYSTEM [9]

Stages	Cooperative challenges	Competitive challenges
Birth	Work with customers and suppliers to define the new value proposition around a seed innovation.	Protect your ideas from others who might be working toward defining similar offers.
Expansion	Bring the new offer to a large market by working with suppliers and partners to scale up supply and to achieve maximum market coverage.	Defeat alternative implementations of similar ideas. Ensure that your approach is the market standard in its class through dominating key market segments.
Leadership	Provide a compelling vision for the future that encourages suppliers and customers to work together to continue improving the complete offer.	Maintain strong bargaining power in relation to other players in the ecosystem, including key customers and valued suppliers.
Self-renewal	Work with innovators to bring new ideas to the existing ecosystem.	Maintain high barriers to entry to prevent innovators from building alternative ecosystems. Maintain high customer switching costs in order to buy time to incorporate new ideas into your own products and services.

III. CONCEPTION

TABLE IV
CROSS FRAMEWORK FOR KNOWLEDGE BASED DECISIONS IN
BUSINESS MODEL INNOVATIONS

	Lifecycle phase/stage of a business ecosystem							
	Birth			Expansion		Leadership		Self-renewal
	Re-search	Action and experimentation	Value creation	Development of economies of scale	Mitigation of conflicts between members	Appropriation	Creation of long term strategies	Regeneration Continuous improvement
Type of ecosystem	The technology ecosystem							
	The marketplace ecosystem							
	The scaling ecosystem							
	The accretive ecosystem							
	The cooperative ecosystem							
	The value chain ecosystem							
	The integrator ecosystem							
Innovation stage	Ideation	Concept	Translation	Identification of customers	Creation of a value chain	Appropriation		
Innovation phase	Invention			Commercialization		Commercialization		-

Table IV presents a correspondence between the knowledge in three areas: (1) invention and commercialization phases of innovation, and the (2) phases of a business ecosystem's lifecycle, and the (3) types of ecosystems.

For example, if we prepare for the Value chain ecosystem innovations, we must use knowledge about stakeholders and their activities, and define the life cycle phase and stage of the ecosystem. If the ecosystem is in phase of expansion, there are two stages of acting: Development of economies of scale and Mitigation of conflicts between members. The strategic decision is to make commercialization of the innovation. During this phase, it must be identified customers' needs or created value chain.

In the sense of knowledge organization through the business model process it is necessary to clearly delimit the concepts of data, information, and knowledge. Data is a series of directly observable properties of things. Information is the accumulation of data in a higher- level beam with meaning filtered through a person's perceptions and thoughts (cognition). Information stimulates one wide range of actions and activities. Knowledge is extracted from data and built on information. [15]

In formal level, the process of decision making process should consist of phases as follows: (1) Information collection

or problems defining, (2) Conceptualization of knowledge, (3) Creation of knowledge model- elements and relations, (4) Testing and decision making support, (5) Application.

Depend on level of sophistication, different tools for decision making could be used, such as well-known the stage model, Artificial Intelligence, decision tree, cognitive mapping etc. Artificial Intelligence (in the sphere of expert systems) has some limitations at the strategic level. It is focused on well- defined problems, and its limitation is a closed problem space generated from a finite set of objects, relations, and properties. It applied in systems, which define the structure of expert knowledge by integrating with conventional computer systems- especially database and spreadsheet- based system, and financial analyses, modeling, forecasting, and reporting system. Appropriate tool for decision making support is Expert evaluation method in case of informal process.

A limitation in the proposed conception is that it is difficult to apply formal knowledge framework because its structure is based on cognitive models. Consensus between applicants in different teams is hard to achieve and time consuming.

IV. CONCLUSION

As a new asset in improving organizational competitiveness, knowledge management conception has often been used, and its management and application has been widely studied. Most research aim to identify the storage, and diffusion of knowledge for the accomplishment of tasks more effectively. In comparison, author of this research proposes a conceptual cross framework for knowledge based decisions in business model innovations.

The framework links knowledge fields necessary to innovate and business model improvement. Furthermore, this research makes an important contribution by providing a starting point of future research through the integration of knowledge management in the conception of business models.

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Emergence of "Economic Intolerance" as a Result of Changed Economic Circumstances from the Covid-19 crisis

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Abstract – The today's Bulgarian contemporary trade law recognizes the institute of "economic intolerance", as one of the tools through which certain commercial relations can be amended or terminated by court order, when their implementation is contrary to and contradicts the established commercial practices and, more precisely, perceptions of fairness in commercial relations and the good faith of traders. The spread of the Covid-19 virus has greatly affected our economy, and the consequences of this have also led to the need of cancellation of many commercial transactions and contracts, and one of the most used tools for resolving disputes related to the non-fulfillment of commercial transactions, turned out to be precisely the norms regarding the "force majeure" and the "economic intolerance".

Keywords – Covid-19, non-performance of trade contracts, economic intolerance, Clausula rebus sic stantibus.

Only until a few months ago, and for more than 2 years, our society was subjected to a serious test, which was to overcome the consequences of a virus known as the SARS-CoV-2a type coronavirus, abbreviated as Covid-19. One of the most affected spheres was precisely the sphere of the economy, which, like the other spheres of our life, suffered an extremely large blow, and overcoming the consequences in it may take decades. Already with the emergence of the first cases of the spread of the virus in Bulgaria, entire production, logistics and trade cycles were disrupted, and the introduced state of emergency measures failed to make the desired preventive intervention, and subsequently the economy began to slow down, and individual economic entities to fall into a situation where the assumed commercial obligations cannot be fulfilled. The first legal disputes related to the non-fulfillment of commercial contracts due to "force majeure" or due to the onset of „economic intolerance“ also began to appear.

This article aims to make an in-depth analysis of the applicability of „economic intolerance“, and without pretending to be comprehensive, which can hardly be achieved in the practically vast field of commercial legal cases, through it, an attempt will be made to outline some of the fundamental points related to its application, and arising as a result of the spread of a viral pandemic disease, such as that caused by the Covid-19 virus, consequences for amending or terminating agreements reached between participants in

commercial relations. As for a more complete and in-depth study of the issue, it is necessary to visually and in detail examine the will of the legislator reflected in the provision of Art. 307 of the Bulgarian Trade Law¹ (BTL). It must be assessed under what conditions it can be assumed that the spread of the Covid-19 virus is a factor and circumstance that can cause such a change in public relations to be accepted as a circumstance-ground for declaring economic intolerance and base of initiation of legal proceedings for amendment or termination of an existing contract between two parties in a commercial legal relationship.

Art. 307 of the Bulgarian Trade Law reads:

Art. 307. (New - SG No. 83 of 1996) The court may, at the request of one of the parties, amend or terminate the contract in whole or in part, when such circumstances have occurred that the parties could not and were not obliged to predict, and the preservation of the contract is contrary to justice and good faith.

As a phenomenon in law, non-performance of commercial contracts has existed since ancient times, as circumstances such as "Vis major"² which later evolve into "Force majeure"³ were one of the frequently applied methods by which the parties, sometimes voluntarily, sometimes judicially, resolved the arising disputes when the execution of a given transaction could not be carried out because a circumstance arose that could not have been foreseen at its conclusion, and the occurrence of negative legal consequences for the parties to it prevented in view of their capabilities. In the development of this institution, and with a view to increasing the complexity and intensity of commercial relations, the institution of "economic intolerance", also known as the "Clausula rebus sic stantibus"⁴ doctrine, appeared later in law, which, like the institution of "force majeure", aims to regulate and create legal possibilities in which an already concluded and valid contract, can be amended or terminated when certain circumstances occur. That lead to the fact that if the contract is performed, then its performance may lead to a violation of the fundamental principles of justice and good faith in relations between subjects. And despite the fact that it did not arise naturally, and the doctrine is a fruit of modern legal thought, it was made with the purpose to creates an opportunity necessary for the law, in which if one of the parties to a given commercial transaction believes that, with the fulfillment of its obligations, lasting consequences will occur for her, and a dangerous precedent will be set for society as a whole. That why the law gives opportunity of claim request through the court, who based on its just judgment, to modify or terminate the operation of an existing contract. That is how, through the fair judgment of the court,

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it is aimed to impose legally relevant behavior on the parties, so that, from a factual point of view, commercial cases are decided in the fairest way, and the system of relations between traders is stable and predictable.

According to the in-depth analysis of the legislator's will, implemented in the legal norm of Art. 307 of the Bulgarian Trade law, will help us to better understand and apply the institute, and for this, if it is necessary to delve more thoroughly into the used terminology and legal lexical concepts used for the more correct settlement of this type of commercial relationship.

First of all, we will analyze the desire of the legislator to assign the obligation of the parties, when the institute of economic intolerance is applied, to do so only through the judicial system. The main reason for this is related to the understanding that only the state with its authority in the form of the judiciary can demand and impose a certain behavior against the will of the parties, and contracts should not be an exception. It is for this reason that we accept that court decisions are equal to the force of law by legal value, and their implementation is mandatory for the parties. By granting the monopoly on justice, the state accredits the judicial authorities to be able, after an objective assessment of all the circumstances and the acceptance of admissible evidence, to influence the commercial relations between the parties to a contract by issuing a judicial decision, amending or terminating them. Another argument in this direction is based on the understanding that the main purpose of commercial law is to regulate the order in which the agreements reached must be observed⁵, and when it is necessary to amend existing contracts, this should only be in exceptional cases and only in the interest of preserving law and justice. Therefore, judicial intervention is necessary in order to restore the balance in the relations that were disturbed not by the will of the parties, but by an external factor - a circumstance that became a legal fact manifested beyond their control, power and will.

The judicial intervention, as an external one, will also be manifested under one other condition - when all alternative legal options provided in the contract between the parties to resolve the dispute, have been exhausted. Then, in view of the assessment of the legal fact - a law-changing circumstance, the parties are given no other option than to resolve the dispute that has arisen between them, with one of them asking the court to rule and ascertain that the reason for the non-performance is not the desire, will and ability of the requesting party, but a circumstance who arose and who could not have been foreseen at the time of the conclusion of the contract, and the consequences of its occurrence, prevented. Moreover, rebuttable presumptively, the court assumes that the other party in the commercial transaction has expressed disagreement and unwillingness to amend or terminate the contract, and possibly sought compensation for the damages suffered by it and lost benefits from its non-fulfillment. This was also the claimant motive for asking the court to discover and establish the objective truth behind the non-performance and to rule with its decision that the impossibility of performance is due to conditions that appeared after the assumption of the obligation under the contract, preventing its

performance and implementation, and more importantly for the law, if the obligation is fulfilled under the terms of the still valid contract, then this will contradict the imposed and generally accepted understandings in society about fairness and good faith in relations. And it cannot be otherwise, because there is no way to justify a decision as fair, given that one of the parties, despite being able to fulfill its given obligation, will be damaged by its realization. Therefore, the only procedure provided for in the law, in which a unilateral amendment or termination of an existing contract may be requested due to the occurrence of an external unforeseeable circumstance that makes the contract enforceable, but contrary to justice and good faith, is the procedure of Art. 307 of the Bulgarian Trade law and any other order, that the parties wish to use different from it, will not have legal effect and will not lead to the legal consequences desired by the parties.

What is the claim that must be presented to the court panel in order for the interested party in a given case to request from the court the change or termination of contractual relations under Art. 307 of the BTL?

The claim, that is filed and maintained, is essentially a constitutive claim⁶ i.e. a claim addressed to the court aimed at establishing the existence of given facts, and based on their acceptance, to make a justified legal decision whether to change the terms of an existing contract, or to terminate it, or to leave it in force. Thus, on the basis of the constitutive claim, the protection of a special right is achieved, which is admissible in the laws only if it was expressly provided in them, and is also known as a potestative right⁷, because in its essence, the admissible special legal process aims to introduce changes, led from having to ascertain to what extent the changed conditions of the environment affect the fair relations between subjects. A common mistake made by corporate lawyers is that they consider this type of claim to be contentious or serve to resolve a commercial dispute where the opposing party also has the right to defend, and that the court is obliged to provide a legal opportunity to undertake a defense and to be able to present evidence through which to protect his interests. The main argument in this direction is that, that in the end, the counterparty in the commercial transaction will also suffer the consequences of an amended or terminated contract, and the resulting commercial transaction will be different from the original expected one. Precisely because of the latter, the defenders of this theory believe that the court is obliged to provide an opportunity for protection and equality in the process with the claimant. But this is not the case, because although the result of the case will be precisely the occurrence of changes in the obligations of the opposite party, this will not be fair, because the purpose of the claim is to protect the affected party's interests by proving that the law-changing circumstance occurred or has occurred beyond its control and will, and the continued validity of the contract will lead to unfair consequences. The court, for its part, in response to the claim, will discuss the existence of the facts and circumstances that led to a change in the environment, how they affected the normal relations in it and how, if the claim of the party is not satisfied, the principles of justice and good faith will be applied. An extremely good

definition and argumentation in support of the rightness of the rule-maker in creating this legal order for the resolution of similar cases was made by Prof. Ognian Stamboliev⁸ which defines the conditions under which the claimant's posttestatory right follows and can be exercised and the forms and methods of defense of the opposite party. Of course, no one should be left with the impression that the counterparty under the given contract is completely deprived of the right of defense. The form that the legislator has foreseen is, that when such a case is initiated, the party to the contract, who will eventually suffer certain legal consequences⁹ from the partial or total non-fulfillment of the obligation, will be able to protect his legal interest by filing a counter-constitutive claim. That is the way, which the other part can manifested a legal effect in the event, that the judicial body passed a decision by which it granted the request of the party that originally filed the counterclaim. In support of this thesis, the understanding has been developed that it is precisely and only with posttestative - law-changing claims that maximum justice is achieved in relations and they are a kind of mandatory form for solving cases in which, due to the changed relations, such conditions have occurred in the environment, which have led to the fact that if a given contract is fulfilled, one of the parties will be damaged, and this contradicts the understanding of the legal system. But if the claim is not proven, then the other party will receive its performance, including compensation for the delayed due performance on the commercial transaction. This concept was also adopted by Prof. Ivan Rushev¹⁰ according to which the institute "does not harm the other party to the legal relationship, because if the constitutive claim is rejected, the party affected by the alleged intolerance will bear responsibility for culpable failure to fulfill its obligations, and its economic situation should not have worsened precisely because of the lack of economic intolerance."

In the second place, the question regarding the formation of the court decision must be considered, and the assessment of the circumstances from which it can be concluded, which clauses of the contract should be revised and the scope of the change - in whole or in part. This is a legal option that is provided to the court, which with its decision must make an assessment whether and to what extent to honor the claim of the party that, referring to the subjective conversion right granted in the provision of Art. 307 of the BTL aims to protect its interest and protect itself from damage. After the case is admitted to consideration and the constitutive claim is upheld, the judicial process takes place under the important condition that the court has the opportunity, in view of the evidence provided, to assess to what extent, and decide how the changed social relations have affected the obligation that the claimant party has. And in case of their performance, to assess to what extent and by whom the circumstances should be foreseen, when they occurred and whether there is a default by the claimant in the case, i.e. is he in a state of "de facto" delay, to what extent can it be considered that the conditions of the environment have changed, how unforeseeable were the circumstances that led to the claim, and so on. The judgment of the court must be based on the analysis of all the circumstances cumulatively included in the norm and their

manifestation in the legal reality and how they influenced the manifestation of an event that should be accepted as the legal right-generating fact that would lead to "economic intolerance". The party that filed the claim to start the process must very categorically confirm the "economic intolerance" that has occurred and provide suitable evidence for the moment of its occurrence, because in this way it actually determines the time period and the limit of judicial competence, which is also time-bound. The moment with the onset of economic intolerance is extremely important for determining the scope of contractual changes and honoring the claim. If the evidence is accepted as fact, and the claimant's posttestatory right is accepted, the court is bound to order the change in the contract and, by virtue of the "res judicata," require the parties to the case to perform the award. In fact, the court cannot establish or decide anything other than what the interested party- claimant wants. If the purpose of the constitutional action is to change the terms of the contract, the court should make an assessment and order a change, and if termination is requested, the court should terminate the contract in view of the circumstances, but in no case should it show self-initiative and to decree something other than the claim of the claimant. The latter is controversial because, on the one hand, the court is approached and justice is sought through it, and on the other hand, it must take into account the will of the claimant.

Thirdly, the court must make an assessment as to whether the circumstances that occurred are legally relevant, and whether it is precisely as a result of them that the substantial change in the economic interests of the party obligated under the contract has occurred. In order to proceed to an assessment of the circumstances, the court must already have accepted that for the claimant in the posttest case there already exists both an obligation to perform and a need to amend or terminate the current contract. With the implementation of the so-called judicial judgment, the nature and significance of the circumstances that have arisen will be investigated. Also the court will decide what is the causal relationship between these circumstances and how the changed public relations are assessed. This evaluative analysis serves for the court to clarify for itself and for the interested parties whether, if an amendment or termination is allowed of the contract, the relations that exist between the parties will continue to be on a fair basis or "vice versa", whether if no amendment or termination of the contract is allowed, the principles of fairness and good faith in the relations between the subjects will be violated, and damage will be done to the requesting party and benefited from the posttestative right under Art. 307 of the Bulgarian Trade law. Moreover, the judicial discretion is aimed precisely at deciding which evidence is admissible and which is not, and how, after being accepted as such, to what extent they had an impact on the fulfillment of the agreed upon and binding them through a judicial act, will be whether it helps to observe the principles of law related to justice and good faith or not. Or in other words, in addition to the assessment of the admissibility of the circumstances and the extent of the impact on the interests of the parties from these circumstances, the court must also assess their impact on

the possibility of the claimant to fulfill his obligations under the contract in its current state. Moreover, the court is also obliged to make an assessment of the degree of change in the circumstances from their type that was when the contract was concluded and their type now when a change or termination of the contract is requested. By measuring the change of circumstances in the various stages of the contract, in fact the decision of the court is objectified and motivated and the decision is justified once again, which must protect not only the interests of the parties, but also the public relations arising in the economic sphere.

Fourthly, could these circumstances have been foreseen by the parties to the commercial transaction and were they obliged to foresee them, and to what extent?

It is extremely important to specify that, in fact, Art. 307 of the BTL concerns the activities of persons - traders within the meaning of the law, which means that they are persons possessing a special status, such as the status of a trader, carrying out a certain range of commercial transactions by occupation, expressly stated in Art. 1 para. 1 of the BTL, received this status through a permit-registration procedure, and has, in addition to extended legal capacity compared to other persons in society, and accordingly bears greater legal responsibility when carrying out his activity. It is also accepted that once a person receives the status of a trader, then he is expected to have professional expertise and experience in order to carry out a correct commercial activity by profession and conclude commercial transactions, which are always the result of a volitional informed decision. In addition, it is accepted that in all his actions the merchant must be in good faith and exercise the care of a "good merchant" in his affairs.

The term "good trader" or "good merchant", although it exists in the BTL, is not specifically defined and is applied in judicial practice based on the concept derived in Decision No. 1 of 03.01.2014 in commercial case No. 238/2012 of the Supreme Court¹¹ where the care to be exercised by a trader towards his affairs is regulated in detail. Therefore, when referring to the norm of Art. 307 of the BTL, the court is obliged to examine specifically whether the traders in the given commercial transaction, in view of their professional obligations and qualities, could and were obliged to foresee the occurrence of the circumstance that led to the manifestation of the posttestative right or not. As this obligation according to the interpretation of the norm of Art. 307 of the BTL is imputed to both parties, although only one is a party to the case, because the court is obliged to examine whether the circumstance could have been foreseen in general for the commercial transaction between them, that it would occur at the time of concluding the transaction, and then necessarily discuss whether the trading persons could have foreseen the occurrence of the circumstance, and whether they were obliged to foresee it.

What does it mean for a circumstance to be foreseeable and is the good trader obliged to be able to foresee all circumstances that may arise in the legal peace, or is he obliged to foresee only those that arise regularly or systematically and which are hypothetically permissible to

arise in view of the nature of the transaction, and how far can the responsibility of the person professional - trader extend? These are questions, in the answer of which lies the decision in the case. According to the most widespread understanding in theory and practice, a circumstance can be treated as foreseeable because it exists in the legal world and with its manifestation it causes the occurrence of certain legal consequences, which can be both desired by the parties and undesirable. In the case of Art. 307 of the BTL, it is assumed that these consequences are negative and affect the interests of one of the parties, and therefore she wants the court to change or terminate the effect of a given contract, because even if she could fulfill it, she would not be satisfied with what will receive in return. If the probability that a circumstance will occur is high, in view of the imposed practices in reality, it can be assumed that it is foreseeable and the parties, in view of their professionalism, were obliged to foresee it and set it in the terms of the contract concluded between them, and to agree on, if this event occurs, how the consequences of its occurrence should be dealt with. Of course, the opinion can also be accepted that for a given circumstance, in view of its characteristics, it is admissible that the parties could have made a reasonable assumption that, based on their professionalism as traders systematically concluding the same type of commercial transactions, they were obliged to be exhaustive in reaching an agreement, and if a given circumstance, as long as it is not explicitly stated in the contract, then the parties did not assume that it could arise, and therefore they were not obliged to allow its manifestation. Or in other words, if the occurrence of a given circumstance is not specifically stated in the contract, then it can be treated as an unforeseeable circumstance for the trading parties. Yes, but later this unforeseen circumstance appears and it serves as an argument for one of them to ask the court to change or terminate the contract and to declare it a relevant and legal-generating circumstance for the need to change the assumed obligations in the commercial transaction. Based on this, the court must make an assessment, after gathering all the necessary evidence, whether the parties ultimately could and were obliged to foresee that a given circumstance that had already arisen could be assumed to be probable that it would arise to the moment of concluding the transaction between them or not. However, if suitable evidence is not presented to the court and it finds in the examination of the case that the requesting party was obliged and could have foreseen the occurrence of the circumstances that led to the change in the situation, then it will not decree the amendment of the current contract and will leave in force. If it finds that the other party could have, and was obliged to, allow that the circumstance might arise and has not done its due to preserve the fairness of the relationship and has acted in bad faith towards the other party, it too can and should be liable beyond the non-fulfillment of the obligation undertaken towards it. For the determination of responsibility, it is extremely important that the event that occurred and that can be accepted as a law-changing circumstance, be specifically and exhaustively characterized and thus the court is facilitated, and can establish with certainty that for the preservation of the good

morals and justice, the modification or termination of the current contract is necessary.

This analysis of the characteristics of the circumstance and the origin of its nature, which can categorize it as unforeseeable, is extremely difficult to be accuired, as it is difficult to establish and prove what was the probability that the subjects could and were obliged to admit, that a given event of a circumstantial nature will be able to occur and cause a change in the existing public attitude. When all these constituent parts regarding the occurrence and influence of the circumstances that led to the need for the amendment or termination of the contract are accepted and proven before the court, it is easy to reach a determination of the responsibility of the subjects regarding whether they could and whether they were obliged to foresee the occurrence of these circumstances. In the fifth place, how is the assessment carried out whether if the contract retains its legal effect, this will simultaneously contradict fairness and good faith in commercial relations.

To answer this question it is good to define what fairness and good faith are according the trade law and the commercial relations.

The meaning of both terms is associated with the observance of the general legal principles on which all categories of public relations in the modern world are built, and that is why they are applied in almost every branch of law. The basis of any commercial legal relationship is the interest of the parties, as trade law rarely allows for gratuitous transactions and, for a commercial transaction to be such, it must always include the provision of consideration. One more thing, through the provided opportunities to determine the terms of the agreement and the freedom in the same, we can presume that every commercial transaction that is subject to execution was concluded due to a coincidence in the interest of the parties and in order to satisfy some need of the merchants. If there is a coincidence of interests, then the terms of the transaction are accepted as fair by the parties, and the decision to conclude it was made on the basis of informed consent and under the conditions of honesty, integrity and observance of good manners in the relations between traders. Although there is no clear and specific definition of the two concepts in the BTL, their broad interpretation enables the court, in case of Art. 307 of the Trade law, after providing him with suitable evidence, to make an objective decision that, based on the permanently changed circumstances in the environment, it is necessary to issue such a decision, by which to change an already fixed contractual relationship between the parties, so as to restore disturbed balance in their interests and to obtain maximum satisfaction or at least close to it at the time of concluding the transaction between them. Otherwise, if the contract is not amended or terminated, there will be unwanted damage to the party interested in the change, which it would not have suffered if the factual situation had not changed due to the unforeseen circumstance that arose. That is why it can be argued that with the use of broadly interpreted concepts such as justice and good faith as carriers of legal principle, the protection of law and the commitment it has to maintaining stability, balance and fairness in relations between subjects is ensured.

All the above analyzes of the institute of “economic intolerance” will help us to more easily define and give an answer to the question of whether the Covid-19 virus can and should be accepted as a legally relevant and law-changing circumstance, which with its appearance led to the occurrence of unforeseeable events for business entities affected the conscientious and fair performance of their commercial obligations. The law still does not have a definitive answer to this question, which can be universally applied to all relations that have arisen, but it accepts as a fact the effect that the spread of the virus has had and continues to have on the economy of the parties and its ability to influence the performance of contractual relations between the traders. Each case should be considered individually, and the constitutive claim process for establishing the nature and effect of affecting commercial relations based on the pandemic crisis should be precisely discussed and applicable only to cases where the virus has affected the performance of obligations and falls under the period during which the state of emergency declared by law was in effect. The reference to the effect of the spread of the coronavirus infection by the claimant in the court case is not enough, and it must be proven, the unwanted legal consequences that have occurred for the party that brought the claim, which have not yet occurred, but will occur if the court does not, are also subject to proof. The changes that occurred in the economic situation in the country based on the spread of the Covid-19 virus in themselves cannot be treated as creating rights for any economic entity, it must actually prove through all admissible means of evidence the degree of impact, the moment of occurrence of the circumstances of his affairs, and to indicate to the court what should be the change he desires in the contract, in order that it may be performed, or that its effect may be definitely terminated. Or to put it another way, by providing suitable evidence regarding the impact of the Covid-19 virus on the performance of a contractual obligation, the court should order a legal change and amend the contract so that it is performed fairly for both parties, and if not can be amended, or its amendment will not achieve the necessary level of fairness in the relationship, then its effect shall be terminated. With the respect of the posttestative right and the converting claim of the party, there will also be a change in the substantive legal relations of the parties, which change must be fair and correct and based on clear and indisputable evidence that, based on the coronavirus infection and its spread, it has been reached to a permanent change in economic relations, which change could not have been foreseen by either party and they were not obliged to foresee either the occurrence of the given circumstance or the effect of its influence on the performance of their obligation at the time when the contract between them was in the process of being concluded.

With the emergence and spread of the Covid-19 virus, in fact, all processes in the sectors of the state were changed from the beginning, and the fight against the infection became a top priority for our society. With the adoption of special legislation such as the Law on measures and actions during the state of emergency, announced by a decision of the

National Assembly of March 13, 2020 and to overcome the consequences¹² in fact, the state fixed and categorically established for the legal peace that, in addition to being a pandemic disease, the coronavirus infection is a legal circumstance that gave rise to factors in the environment, which in order to be overcome, generally mandatory measures, including those of a restrictive nature, must be taken. The imposition of restrictions led to the disruption of production cycles, the deterioration of logistics and trade channels of supply and distribution, and caused shortages in markets accompanied by increases in the prices of goods and services, but in fact preserved the most valuable for any economy - the life and health of the human resources. With the adoption of the legislation, the state fixes and forms an indisputable legal fact, necessary for the judicial processes in the legal system, that the effect of all concluded contracts, excluding those whose performance is due after 13.03.2020, can be amended or terminated with the instruments of "economic intolerance" or under conditions of "force majeure", due to the fact that the impact of the pandemic on social relations and the extent of their impact has led to such a significant economic change that it cannot but be accepted as an unforeseeable circumstance, and cannot be taking into account its impact on every single contractual relationship subject to implementation while the imposed emergency anti-epidemic measures lasted.

We can conclude that cases related to economic intolerance were until recently one of the most unpopular legal ones, precisely because of the factual complexity of proving the impact of a given unforeseen phenomenon, which has led to the fact that if the execution of a commercial contract is carried out, it will violate the fair interests of one of the parties to the transaction and contradict the principles of good faith in the relations between traders. In order for the institute of economic intolerance to be applicable in the relations between traders during the imposed restrictive anti-epidemic measures related to limiting the spread of the Covid-19 virus disease, it is necessary to indisputably prove in the legal sphere that the virus had an impact on the processes related to the performance of the obligation of the party filing the constitutional claim, and has led to such a change in the circumstances of the performance that it has placed the performance itself in a position that, if carried out, it would be contrary to the established principles and rules of justice and good faith between the two equal parties to the transaction. With the indisputable disclosure of the cause-and-effect relationship between the viral spread and the resulting changes in the environment that led to the impossibility of fulfilling the assumed obligations, the claim under Art. 307 of the BTL will be proven and the law will have realized and achieved its main goal, namely to be a fair regulator in public relations.

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- ⁵ Pacta sunt servanda – lat. Contracts must be observed. A fundamental principle in law. <https://www.cambridge.org/core/journals/american-journal-of-international-law/article/abs/principle-pacta-sunt-servanda-and-the-nature-of-obligation-under-international-law/B47C86674546DA409153A7206A524110>
- ⁶ Constitutive claims are always used when it is necessary for the court to issue a decision by which to impose a given legal change in a given legal relationship by force of law. For constitutive claims, it is assumed that they can be used only and only when the law has expressly provided for their application and in specific cases described in the law. From author.
- ⁷ Potestative rights are also known as rights of opportunity, which give a person the right to unilaterally request and cause a change in a given contractual relationship or in the patrimony of another person. The origin of the word is from the Latin potestas - possibility. From author.
- ⁸ <https://news.lex.bg/искът-по-чл-307-от-търговския-закон-практ/>
- ⁹ But not the one who caused damages. From author.
- ¹⁰ <https://news.lex.bg/искът-по-чл-307-от-търговския-закон-практ/>
- ¹¹ Archive of Bulgarian Supreme Court cases: <http://www.vks.bg/pregled-akt?type=ot-spisak&id=D15C8A0AF414A11DC2257C55004883D0>
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Some Perspectives of Circular Business Models of Fast-Moving Consumer Goods

Petya Georgieva¹

Abstract – A transition to a circular business model is present in this paper. The author makes some explanations about Reusable Packaging Models and the necessity of Deposit Refund Scheme as the base of Circular Business Models application at company's level.

Paper research readiness of Bulgarian society, companies and state toward Circular Business Models.

Keywords – Business Model, Circular Business Model, Fast Moving Consumer Goods, Deposit Refund Scheme, and Innovations.

I. INTRODUCTION

More and more manufacturing companies are talking about circular economy in which businesses create supply chains that recover or recycle the resources used in their production process.

The core of every business activity is the business model, so choosing the right one is a crucial factor in the further success of every business entity. The surviving of the companies in the increasingly competitive economic environment counts heavily on the applied business model and its appropriateness. Some authors [15] state, therefore, that it could be considered as "a fertile ground for innovations".

Creating a circular business model is challenging, and taking the wrong approach can be expensive. Manufacturing companies (from the classical producers to the traditional companies) should create such models.

II. THEORETICAL FINDINGS

A. Business model

Some authors [15] define the business model as "an architectural configuration of the components of transactions designed to exploit business opportunities", i.e., the business model shows the structure and the different combinations between the elements of market exchanges. In other words, this is the way of coordination between the flow of products, services and information among the participants, so that the execution of the business transactions would be possible.

According to the authors, each company embraces an individual business model. However, the business model perspective is not the same as the company perspective. That is because it includes different participants in its transactions,

e.g., partners, suppliers or customers.

Other authors [4, 14] state that the creating of business model is similar to "the development and the use of unique combinations of inter-firm, cooperative arrangements such as strategic alliances and joint ventures".

B. Basic types of business models

Some authors [1] describe four traditional digital business models.

B2B (business to business) consists of trade between organizations or in other words - carrying out business transactions [1]. Involved parties here are mostly wholesalers, manufacturers and distributors. Usually pricing is based on negotiations and with less and less human intervention due to the integration of business systems. Due to the development of Internet and modern technologies, more and more companies (both small global corporations) buy and sell products digitally. According to Nagaty [7], many organizations carry on real-time transactions, so they improve significantly their effectiveness and productivity. According to Buainain, A et al. [1], the companies using the B2B business model need to apply modern and differentiated strategies and approaches in order to achieve their goals.

B2C (business to customer) is a more common digital business model where traders sell products and/or services directly to the end customer. In general, B2C is simpler than B2B as it may consist in a simple online order of food products, technical devices, etc. B2C has major role in e-commerce development where customers can use big discounts and free online services. Thanks to the B2C model, the business has the opportunity to bring to the market new products and to adapt to consumer behavior's changes more easily [7]. The attention is to the individual product and to the customer that prevails over the price and quantity negotiations or supply chain management (activities specific to B2B).

C2B (customer to business) consists of selling products or services from individuals to the business. This is less common and more intuitive model. It could be summarized in the following sentences: the individual announces the price of his/her products/services. Then the companies (the business) get familiar with the terms and conditions of the seller. If they suit them, they bid for the desired good or service. After the tender is closed, it is up to the individual to choose the company which would buy the particular item [7]. C2B also enables the customers to pay their bills without visiting a brick-and-mortar office. There are many examples of this business model: the online platform "Fotolia" gives to many photographers the chance to sell their photos to different companies; thanks to Google AdSense and SurveyScout many organizations make different kinds of surveys, paying to individuals to participate in them.

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C2C (customer to customer) Thanks to the platforms based on this model, the transactions between their users (individuals) are greatly facilitated. Customers, therefore, have the opportunity to buy, sell and exchange products or services between each other. The link between the different individuals is established by online-based platforms. They make a profit by charging fees for the number of transactions, ads, etc. C2C model, unlike B2B and B2C, mainly deals with the business of third parties in order to facilitate and secure the transactions between the individuals and to offer them quality service. Such kind of transactions have been executing since 1995. Nowadays there are many platforms as eBay where individuals can buy and sell goods in a fast, safe and easy way. The world's largest online retailer Amazon combines both B2C and C2C business models. When it comes to Bulgaria, the most popular online marketplace in our country is OLX Group. Headquartered in Amsterdam, it operates in more than 40 other countries, including Poland and Romania.

D. Fast-moving consumer goods

FMCGs are everyday mass products that are frequently bought at a relatively low price [5, 6]. Their demand is high, so are their sales and production volumes. They are distributed generally by retailers in the commercial network. Usually, they are intended for a single use and have a short lifecycle. This is due to the fact that they are perishable or because of their high demand. Such goods are food, beverages, personal care products, household products, pet supplies, etc. [9]. The increasing global consumption requires a production of bigger and bigger volumes of such goods and more single-use packages. In the recent years, there were many new-emerged business models, including reusable packaging. However, due to the ineffective waste recovery systems, these innovative solutions still have not the desirable impact on the global environmental problems [9].

E. Circular business models for FMCG

Multinational corporations like Procter & Gamble, Nestlé, Unilever, etc., typically produce such kinds of goods. The market of FMCGs is increasingly competitive, so each company's products differ somehow from those of the other, i.e., the organizations apply a strategy of differentiation. They rely on their brand portfolio as well.

Unfortunately, a large part of FMCGs production doesn't comply with the principals of the circular economy. Very few of the goods are produced in a sustainable way, including the using of reusable or biodegradable packaging. The companies are mainly focused on their energetic efficiency (including introduction of renewable sources of energy), an amelioration of their manufacturing operations and a better waste management. However, the authors state that there is still a long way to go, i.e., the FMCGs sector needs disruptive innovations and a complete rethink of every process. Thus, the overproduction and the overconsumption of raw materials would be ceased [3, 8].

F. Reusable packaging models

When it comes to the FMCGs, the most popular strategy of waste management in this industry is the recycling of packaging. Nevertheless, the recycling is not on the highest level in the waste hierarchy (prevention, reuse, recycling, recovery, disposal) [9]. Moreover, it is far from enough to prevent the using of raw materials in FMCGs' packaging manufacturing [13]. Thus, the recycling manages only the final stage of the product lifecycle and it couldn't overcome the obstacles engendered by the overproduction.

According to Plastic Europe (2020) [11], the packaging is the major user of raw materials constituting over one-third of the total plastic demand. The use of a packaging material becomes even higher with the increase of the retail sales and with the advent of a large variety of convenience products.

Nowadays, there are numerous innovations regarding the packaging of FMCGs. They are mainly focused on putting in less material per unit. For instance, the packages are becoming lighter or recyclable and have eco-labels. Nevertheless, according to the European Commission (2008) [2] and Coelho et al. [10], the reuse or the prevention are still the preferred options to the recycling or the disposal.

Though the beneficence of the reusable packaging to the single-use packaging regarding the environmental protection is obvious, the role of the customer and the logistics is crucial. Before implementing an innovation including reusable packaging, it should consider the attitude of the customers. The reliability and the carbon footprint of the forward and the reverse logistics chain should be taken into account as well.

G. Deposit refund scheme (DRS)

DRS systems are not a new invention. In fact, in some countries they are well known for decades. In others, they have been recently adopted, so DRS are still on the initial phase of their development, i.e., they are represented just by the return systems. In this context, the latest are often considered as an obsolete approach over the modern collection systems. In table 1 is summarized a short historical information about the introduction of DRS in several European countries.

TABLE 1
HISTORICAL INFORMATION ABOUT DRS [12]

Introduction of Deposit Return Scheme	
Year	Country
Refillable bottles since 1929	Germany
1950s	The Netherlands
Recyclable glass bottles since 1950s	Finland
1976	Spain
Cans since 1984	Sweden
Before 1989	Czech Republic
1989	Iceland
Before 1990	Slovakia
1993	Austria
1993	Norway
Single-use PET bottles 1994	Sweden
Since 1996 for cans	Finland

2000 for beverage packaging	Switzerland
2002	Denmark
Single-use beverage containers since 2003	Germany
2005	Hungary
2005	Croatia
PET bottles and cans 2006	Sweden
2008 for PET (polyethylene terephthalate) bottles	Finland
2011 glass bottles utilized as materials	Finland
2016	Cyprus

F. Operators of DRS

The creation and the operation of the deposit systems could turn out quite challenging. A thorough organization and not a few expenses are needed in order to achieve an efficiently working Deposit Return System. In this context, it is essential to define the responsible one for the operating of the DRS. It might be a private company, a municipality or both. It is possible to exist voluntary agreements as well. In the Netherlands there is a mixed system where large plastic bottles are handled by a deposit system and the small plastic bottles and other plastic packages are collected by the municipalities. In Estonia, the DRS are operated by so-called producer responsibility organizations. In Hungary, the responsible unit is an extra budgetary fund named Environment Protection and Energy Efficiency Fund.

III. EXPERIMENTS

This research uses methods, including semi-structured interviews and an online survey. They make possible the participation of multiple stakeholders in the research process. Thus, a greater diversity of the data is achieved. Thanks to the data collected from the interviews, the author managed to develop the customer survey.

The circular business models are based on well-developed DRS at a national, a regional and a municipal level. In order to run a DRS, it is a must to involve the industry, the private companies, the municipalities (regional bodies), the voluntary arrangements and other stakeholders as well. The structure of the research is as follows:

IV. RESULTS

The DRS are beneficial for the environment as they contribute significantly to the decreasing of the littering. Nevertheless, the introducing of such eco-friendly systems is often challenging. Buying and installing specialized machines where people can return the used packaging and then receive their deposit, organizing the logistics chain and changing the customer behavior could be quite expensive. In many countries like Bulgaria, DRS are not adopted due to lack of funds and motivation to educate and change the mindset of the people. In contrast, in other countries the authorities impose some regulations because of the positive future impact of the DRS on the environment. For instance, in 2003 in Germany

the government introduced an obligatory deposit to encourage people to use reusable packaging.

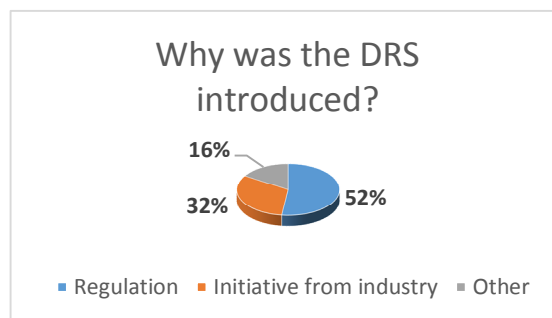


Fig. 1. The reasons of DRS introduced

According to the EPA Network survey, the DRS were adopted mainly because of a regulation (52%). 32% of the respondents consider that this is due to an initiative from the industry and 16% stated other reasons.

EPA Network research shows that the initiative for the implementing and the running the DRS in most of the countries are led by the industry and some private companies (see fig. 2).

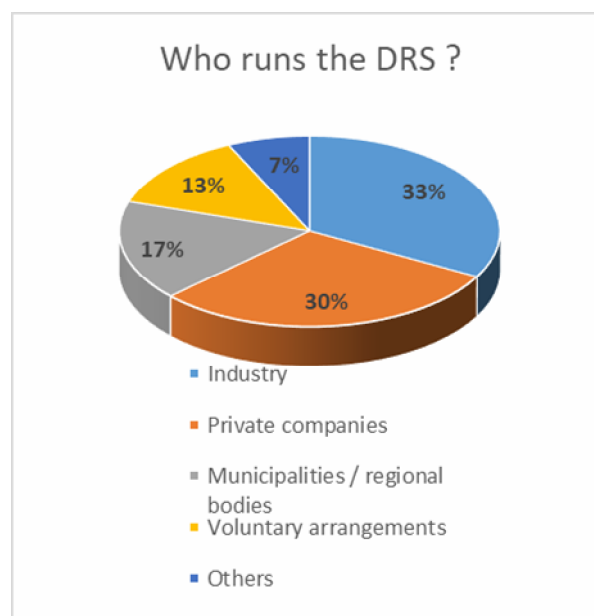


Fig. 2. Actors for DRS running

Based on the interviews and the literature observation, the author of this research considers that currently the deposit-return system is only tested and demonstrated in Bulgaria. According to the government, DRS is about to come into mass use in the near future and it will be on a European model. This way Bulgaria would meet the EU requirements and the people would become more responsible when it comes to the preserving of the environment. Currently, in our country there are few operating collecting machines in some Bulgarian municipalities and in some retail chains. They are under pilot projects or exist thanks to the initiative of some retailers.

According to a speech of the former Minister of Environment and Water Borislav Sandov in the National Assembly, the large retail chains in Bulgaria have taken a commitment to introduce in their supermarkets special machines for collecting used plastic bottles, i.e., it would be far more convenient for the customers to return such kind of package.

According to the former Deputy Minister of Environment Nikolay Sidzhimov, the main parameters of the DRS systems (location of the reception points and machines, the load on the system, etc.) will be evaluated until the end of 2022. He considers that by 2023 DRS could be introduced in Bulgaria for the very first time.

Bulgarians are familiar with the principle of the separate waste collection. They used to return jars and glass bottles to the place they had bought them. Even nowadays, many supermarkets, grocery stores and restaurants take a deposit from their customers for every glass bottle.

However, mainly the older Bulgarians are familiar with this opportunity. According to an author survey, 62% of the respondents embrace the idea of introducing a DRS and only 9% disapprove it. The others consider that they had not enough information to give a correct answer. It is worth mentioning that 82% of the participants tend to return their used bottles to the supermarket if they receive a deposit in return (i.e. the value of the returned bottle that they have previously paid). Therefore, it is crucial to thoroughly inform the people about the opportunities and the advantages that DRS offers. This way the DRS would be widely accepted.

In terms of the FMCG, the Bulgarian companies may start to apply different strategies connected with the principles of the circular economy and based on technologies and innovations as achieving zero waste, finding a buyer for by-products, cleaning and reusing of the packaging, composting revalorizes biomaterials and organics used in consumable products and their packaging, and doing unusual partnerships.

V. CONCLUSION

An overview of the transition from the classic business model to the circular is made in this paper. Author of the research presents the importance of having a state- level DRS in terms of the survival and the development of a new business model. An examination of the literature has been performed and interviews have been conducted in order to provide more in-depth information about the DRS in different EU countries and to help us better understand how to make such systems in Bulgaria work properly and efficiently.

The results of the study suggest that the main initiatives concerning the establishment of such a system should cross the borders of the business and only then could they penetrate at a state, a regional and a municipal (urban) level. In the present circumstances, the Bulgarian companies could start introducing some innovative waste management strategies in their business models and establishing unconventional partnerships. Nevertheless, the government should be involved in these processes. It is supposed to support the business to implement DRS at a state, a regional and a municipal level.

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Optimization Model for Financial Planning of Production Costs

Radi Dimitrov¹

Abstract – The object of the present research is the modern concepts of financial management of industrial enterprises. The main goal is to design an optimization model for financial planning of production costs in the implementation of the production program of industrial enterprises. The paper focuses on the planning of the financial indicators, through which the management of costs for the implementation of the production program is carried out. The toolkit of the presented optimization model for financial planning of production indicators is based on a deterministic combined approach for the metrication of forecast-resultative and factor indicators of costs related to the production process.

Keywords – optimization model, financial planning, production costs

I. INTRODUCTION

The digital transformation on a global scale has caused a number of process reforms in the world economy and in particular the financial management of enterprises. One of the main challenges is the introduction of smart technologies into business processes. Considering the social and economic challenges, due to the global pandemic COVID-19, a number of technological processes related to the digital transformation of economic enterprises have also accelerated at high rates.

In particular, this in turn contributed to the development of technological and business processes in industrial enterprises and provided conditions for the accelerated development of the fourth industrial revolution - Industry 4.0, and the transition of the global economy to the fifth industrial revolution - Industry 5.0. In this regard, a significant emphasis is placed on the financial management of industrial enterprises, which is increasingly based on business information systems and the functions that they provide to their users in terms of the organization and management of the financial and property status of business entities, the supply of resources, contractual relations and sales of products to counterparties, accounting, etc.

The object of the present study is the modern concepts of financial management of industrial enterprises. The research focuses on the planning of the financial indicators, through which the management of costs for the implementation of the production program is carried out.

The main goal is to design an optimization model for financial planning of production costs in the implementation of the production program of industrial enterprises.

The exposition of the present research is limited to the

study of the main cost indicators related to the implementation of the production process, based on forecast-resultative and factor elements.

The study complies with the legal regulations of national and European legislation as of July 31, 2022.

II. EXPOSITION

Business information systems reflect the modern transformation of digital management. An increasing number of business organizations use similar systems in their activities, as their application facilitates and optimizes business processes related to resource and supply management, customer relations, financial management, payments with counterparties, etc. As part of the information system, the ones listed so far are approved in a single software application that can be managed by employees authorized for this purpose or directly by the managers of the respective organization. In this order, through the application of business information systems in industrial enterprises, the activities of organization, management and control during the implementation of production are improved.

From a theoretical-methodological point, Pl. Pavlov defines that "The main goal of business information systems is the effective management of all enterprise resources (material, technical, financial, technological and intellectual) to maximize profits and satisfy the material and professional needs of all enterprise employees." [1]. In the case of "effective management" in the industry, the place and role of the planning of financial indicators (revenues, expenses, financial result, etc.) should be clarified, through which optimization of the maintenance of the production process can be achieved. In this order, the effective planning of cost indicators for production has an extremely important role in the implementation of the production program and the realized financial result on this basis. Financial planning of production costs should also be taken into account with the specifics of the enterprise's activity and the peculiarities of the production process. On this basis, an adequate planning model should be approved by applying a specific toolkit.

The toolkit of the presented optimization model for financial planning of production indicators is based on a deterministic combined approach for the metrication of forecast-resultative and factor indicators of costs related to the production process. Taking into account the specifics of the indicated financial indicators and due to the fact that for the purposes of planning, the same or comparable measures of the result and factor quantities should be used, the author applies the value (monetary) measures of data as a basis for metrifying the planning of the production process. Financial planning of production indicators is modelled according to a

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certain algorithm applying a deductive approach, which includes the following several stages of planning procedures:

First, the financial indicators of the production program are diagnosed by establishing the estimated financial result desired by the production enterprise by measuring its constituent elements, including the planned production costs and the estimated value of the revenue from the realization of the same production.

Secondly, an optimization model of the cost indicators for production is designed, which determines the optimal value of each individual type of cost for the realization of the production process and sets optimal restrictions in the implementation of the production program.

1. Diagnostics of the financial indicators of the production program

In this study, the production program should be understood as the volume of production, expressed in the amount of manufactured product, by individual types, for a certain period of time (week, month, quarter, year). In order to establish the security of the production program with the necessary volume of production for the relevant period of time, emphasis should be placed on the expected amount of costs that directly affect the production process, as well as the expected volume and amount of sales of the same production.

When planning the financial indicators of the production program, a specific volume of the manufactured product is set, which the industrial enterprise wishes to reach based on the contracts concluded with the counterparties and the needs of the market where the same production is realized. After establishing the volume of production, the initial stage of financial production planning begins.

The industrial enterprise must stake the expected amount of the financial result of the implementation of the production program, which is expressed in profit or loss from the implementation of this program. In addition to the above, restrictions should be placed regarding the value of the financial result, as it must be a positive value and accordingly strive to maximize its value.

The measurement of the financial result is done through an apparatus with mathematical formulas, in which the amount of expected sales revenue is compared with the amount of expected production costs and the specified limits are set as follows:

$$\begin{cases} PFR_j = PSR_j - PC_j \\ PFR_j \geq 0 \\ PFR_j \rightarrow \max, \end{cases} \quad (1)$$

where:

PFR_j is the value of the estimated financial result of the implementation of the production program for the manufacturing of type "j" of product;

PC_j is the value of the planned production costs for the manufacturing of the product of type "j";

PSR_j is the value of the planned revenue from the sale of product of type "j".

The presented mathematical apparatus reflects the value of the planned financial result, which is obtained on the basis of the produced volume of production in accordance with the production program at a specifically determined market price, deducting the actual costs of the manufactured products. For the purposes of financial management, the established result can be divided by the planned volume of production, thus obtaining the estimated financial result per unit of produced and realized products.

With regard to the approbation of the data for the application of the mathematical formula, the planned production volume is determined by the production program of the industrial enterprise for the specific period. The value of the planned revenue from sales is established based on the planned volume multiplied by the market price, formed based on the conditions of the market in which this production is realized. Planned production costs are metrified on the basis of actual costs based on an analysis of the results of the period taken as the basis. In the event that the industrial enterprise starts the production of a new product, conditional data is applied for planning production costs based on the market price of resources, the rates of remuneration and insurance of the personnel employed in production, as well as the value of the depreciation costs of the production equipment etc.

The financial planning of the indicators determining the expression of the financial result - expected sales revenue (PSR) and expected production costs (PC) should set mathematical restrictions, where on the one hand production costs should be minimized, and on the other hand another to maximize the sales of the manufactured product. For this purpose, the following formulas are applied:

➤ To minimize planned production costs:

$$\begin{cases} PC_{jx} = PC_{x1j1} + PC_{x1j2} + \dots + PC_{xnjn} = \sum_{k,j=1}^n PC_{xkj} \\ PC_j \rightarrow \min, \end{cases} \quad (2)$$

where PC_{jx} is the value of the planned costs of type "x" for the production of "j" type product.

➤ To maximize projected revenue from product sales:

$$\begin{cases} PSR_j = PSR_{j1} + PSR_{j2} + \dots + PSR_{jn} = \sum_{j=1}^n PSR_j \\ PSR_j \rightarrow \max, \end{cases} \quad (3)$$

where PSR_j is the value of the planned revenue from the sale of production of type "j".

Thus, on the basis of the expected financial result, the costs for carrying out the production process for a specific type of production and the expected revenues from the sale of the same should be planned. The indicator, which is set at a preliminary stage based on the prepared production program, represents the volume of production that must be optimized or maximized after diagnosing the value of production (actual

costs). In the event that the production of a certain volume of output generates a negative financial result - a loss, this same volume should be optimized, since it is not profitable for the industrial enterprise. If the production of the specified volume of output generates a positive financial result - profit, this same volume can be increased until reaching the optimal limit, at which the value of sales revenue is maximized and the optimum of the actual cost of the produced output is reached.

2. Modeling of the financial planning of the cost factor indicators of the production program

The next main point in the construction of an optimized model for financial planning of cost indicators is the establishment of the created structural elements as part of the total cost of the estimated output, since they represent the active part of the production process and on them the industrial enterprise can seek direct influence through optimization, additional investments, restructuring, etc.

On the basis set out in the previous paragraph, the modeling of financial planning is deepened by detailing the individual groups, and in these costs the factor indicators of production costs by individual structural elements are considered.

An essential point is the classification of production costs, and this can be done on the basis of accounting belonging to the costs of the main (operational) activity, through which the actual cost of the manufactured product is calculated, as follows:

- Energy intensity costs (costs for energy sources and fuels);
- Costs of material intensity (costs for materials and resources for production);
- Costs for external support of the production process (costs for external services related to the provision of the production process);
- Costs for operation (depreciation) of production facilities (machines and equipment), including operation of durable tangible and intangible assets;
- Labor costs of the personnel employed in the production process, including costs for remuneration and insurance at the expense of the employer;
- Other costs related to the implementation of the production process;
- Costs of technological marriage related to the implementation of the production program;
- General production costs, including the fixed and variable costs of the industrial enterprise, which are carried out during the implementation of the production activity, but they are not directly involved in its process.

Adapting the above to the mathematical constraint of optimizing (minimizing) production costs, the total production costs can be calculated as follows:

$$PC = PCen + PCmat + PCes + PCop + PClc + PCoth + PCTm + PCgpc \rightarrow \min \quad (4)$$

where:

$PCen$ – value of planned costs for energy intensity;

PCm – value of planned costs for material intensity;

$PCes$ – value of planned costs for external support of the production process;

$PCop$ – value of the planned operating costs (depreciation) of the production equipment;

$PClc$ – value of the planned costs for the labor intensity of the personnel employed in the production process;

$PCoth$ – value of the planned other costs related to the implementation of the production program;

$PCTm$ – value of the planned costs for repairable technological defects related to the implementation of the production process;

$PCgpc$ – value of the planned general production costs.

The optimization detailed model for financial planning of the cost indicators related to the production process should be analyzed down to the individual costs and the ways that they can be optimized for the purposes of the execution of the production program, setting a limit on the value of each individual type of expense as shown in the following lines:

First, in terms of energy intensity cost planning, the measurement value of these should be predicted based on the costs of individual energy and fuel sources, including electricity, heat energy, natural gas or alternative fuel, water, etc. When planning the production for the relevant type of production, the requirement for the necessary types of costs for energy intensity is limited by applying the following formula:

$$PCen = PCen_{x1} + PCen_{x2} + \dots + PCen_{xn} \leq Yen \quad (5)$$

where:

$PCen_{xn}$ is the value of the planned cost of energy intensity from source type "x";

Yen is the optimal value of the planned cost of energy intensity of the production program.

Second, when planning the costs of material intensity, the estimated value of the same costs should be measured based on the individual types of materials and resources needed to ensure the production process of the specific type of product. A mathematical constraint is set for material intensity cost planning by applying the following formula:

$$PCm = PCm_{x1} + PCm_{x2} + \dots + PCm_{xn} \leq Ym \quad (6)$$

where:

PCm_{xn} is the value of the planned costs for material intensity for type of material (resource) "x";

Ym is an optimal value size of the planned costs for material intensity of the production program.

Third, with regard to the planning of external support costs, the estimated value of these costs should be measured based on the individual types of external services provided by suppliers in connection with the execution of the production process. When planning the production of the relevant type of

product, a limit is set in the value of the necessary costs for external support by applying the following formula:

$$PCes = PCes_{x1} + PCes_{x2} + \dots + PCes_{xn} \leq Yes \quad (7)$$

where:

$PCes_{xn}$ is the value of the planned costs of external support for the type "x" of external service determined by the supplier for the implementation of the production process;

Yes is an optimal size of the value of the planned costs for external support of the production program.

Fourth, when planning operating costs, the estimated value of these costs should be measured on the basis of individual types of production equipment, including fixed tangible and intangible assets involved in the production process of the specific type of product. For planning operating costs, a mathematical limit of their value is determined by applying the following formula:

$$PCop = PCop_{x1} + PCop_{x2} + \dots + PCop_{xn} \leq Yop \quad (8)$$

where:

$PCop_{xn}$ is the value of the planned operating costs of type "x" of production equipment;

Yop is the optimal size of the planned operating costs of the production equipment involved in the production process.

Fifth, with regard to labor-intensive cost planning, the estimated value of the same costs should be metrified based on the remuneration of individual structural units and staff positions involved in the production process. When planning the production of the relevant type of production, limits are set in the value of the required types of costs for labor intensity by applying the following formula:

$$PCLc = PCLc_{x1} + PCLc_{x2} + \dots + PCLc_{xn} \leq Ylc \quad (9)$$

where:

$PCLc_{xn}$ is the value of the planned cost of labor intensity from the "x" structural unit/state employed in the production process;

Ylc is the optimal value amount of planned costs for the labor intensity of the production program.

Sixth, for the planning of other costs for the implementation of the production process, the estimated value of these costs should be measured based on the individual types and sources of implementation. When planning the production of the relevant type of products, a limit is set on the necessary types of other costs by applying the following formula:

$$PCoth = PCoth_{x1} + PCoth_{x2} + \dots + PCoth_{xn} \leq Yoth \quad (10)$$

where:

$PCoth_{xn}$ is the value of the planned other costs of type "x" in the implementation of the production process;

$Yoth$ is the optimal value size of the planned other costs of the production program.

Seventh, when planning the costs of technological marriage, the value of these costs should be estimated based on the types of sources of occurrence of technological marriage. For the planning of this type costs, a limit is set in their value by applying the following formula:

$$PCTm = PCTm_{x1} + PCTm_{x2} + \dots + PCTm_{xn} \leq Ytm \quad (11)$$

where:

$PCTm_{xn}$ is the value of the planned costs for technological marriage of "x" type of source of origin of the estate;

Ytm is an optimal amount of the planned costs for technological marriage.

Eighth, with regard to the planning of general production costs for the implementation of the production process, the value of these costs should be predicted based on the individual types of general production costs (fixed, variable, costs from auxiliary activities, etc.). When planning the production of the relevant type of product, a limit is set in the value of the necessary types of general production costs by applying the following formula:

$$PCgpc = PCgpc_{x1} + PCgpc_{x2} + \dots + PCgpc_{xn} \leq Ygpc \quad (12)$$

where:

$PCgpc_{xn}$ is the value of the planned general production costs of the "x" type for the implementation of the production process;

$Ygpc$ is the optimal value of the planned general production costs for the execution of the production program.

On the basis in this paragraph, a mathematical apparatus can be derived, which outlines the consolidated expression for the compilation of an optimization model of the financial planning of costs for the implementation of the production process of production according to individual types of costs indicators. The main objective of the model is to minimize the estimated values of the planned costs in accordance with the needs of the production program subject to the following constraints:

- the value of the planned costs for energy intensity ($PCen$) must not exceed the optimization value of the established factor indicator (Yen) necessary for production;
- the value of the planned costs for material intensity (PCm) must not exceed the optimization value of this factor indicator (Ym) in accordance with the needs of the production program;
- the value of the planned costs for external services ($PCes$) should not exceed the optimization value of the same factor indicator (Yes);
- the value of the planned operating costs of the production equipment ($PCoc$) must not exceed the optimization value of this factor indicator (Yoc) in accordance with the needs of the production program;

- the value of the planned costs of labor intensity (PClc) must not exceed the optimization value of the established factor indicator (Ylc) necessary for production;
- the value of the planned other costs related to the production process (PCoth) must not exceed the optimization value of this factor indicator (Yoth);
- the value of the planned costs for technological marriage (PCtm) should not exceed the optimization value of this factor indicator (Ytm) in accordance with the needs of the production program;
- the value of the planned general production costs (PCgpc) should not exceed the optimization value of the same factor indicator (Ygpc).

For the application of what has been stated so far, the following mathematical system of formulas can be derived, as follows:

$$\begin{aligned}
 PC &= PCen + PCm + PCes + PCop + PClc + \\
 &\quad + PCoth + PCtm + PCgpc \rightarrow \min \\
 PCen &= PCen_{x1} + PCen_{x2} + \dots + PCen_{xn} \leq Yen \\
 PCm &= PCm_{x1} + PCm_{x2} + \dots + PCm_{xn} \leq Ym \\
 PCes &= PCes_{x1} + PCes_{x2} + \dots + PCes_{xn} \leq Yes \\
 PCop &= PCop_{x1} + PCop_{x2} + \dots + PCop_{xn} \leq Yop \\
 PClc &= PClc_{x1} + PClc_{x2} + \dots + PClc_{xn} \leq Ylc \\
 PCoth &= PCoth_{x1} + PCoth_{x2} + \dots + PCoth_{xn} \leq Yoth \\
 PCtm &= PCtm_{x1} + PCtm_{x2} + \dots + PCtm_{xn} \leq Ytm \\
 PCgpc &= PCgpc_{x1} + PCgpc_{x2} + \dots + PCgpc_{xn} \leq Ygpc
 \end{aligned} \quad (14)$$

The optimization model for financial planning of production costs covers all types of costs incurred in the production and the calculation of the actual and cost price. The same can be used in the production of an assortment of several types of products for the production of which the same or similar types of costs are incurred. In this case, for the financial planning of the production of each individual type of product, a specific optimization model is compiled, in which similar types of costs and their constituent factor elements are involved.

When testing the optimization model presented in the present work for financial planning of production costs in business information systems, an algorithm based on OTP and hash-chains similar to the one presented by Iv. Chenchev [2]. The latter would improve the processes of financial management and monitoring, as well as the cyber security of the business information system.

III. RESULTS

This paper presents an optimization model for financial planning of production costs, which is designed according to a certain algorithm, applying a deductive approach and a linear optimization method, which includes the following stages:

In the first stage, a diagnosis of the financial indicators of the production program is carried out by establishing the estimated financial result desired by the production enterprise by measuring its constituent elements, including the planned costs for the production and the estimated value of the income from the realization of the products.

The second stage focuses on the design of an optimization model of cost factor indicators for the production, as it determines the optimal value of each individual type of cost for the realization of the production process and sets optimal restrictions in the implementation of the production program.

IV. CONCLUSION

The present study can be summarized that with the design of an adequate optimization model for financial planning of production costs, the processes of management and monitoring of the main costs for the realization of the production process will be improved.

In a theoretical-methodical and in a practical-applied aspect, the present development achieves results related to the planning of the expected financial result desired by the production enterprise, by measuring its constituent elements, including the planned production costs and the estimated value of the income from the realization of the products. For forecasting the production costs, a specific mathematical apparatus has been developed, which measures at a preliminary stage the effect of the invested costs for the implementation of the production process, including the forecast-result and factor indicators for establishing the dynamics and trends in the execution of the production program.

By applying the proposed optimization model for financial planning of production costs in modern business information systems, it is possible to improve the efficiency of these same systems in terms of financial management and control activities of the industrial enterprise, as well as the optimization of the process of monitoring the performed processes.

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Nature and Problems of Supply Chain Management in the Circular Economy

Plamen Pavlov¹

Abstract – The article examines the problems related to the management of supply chains that arise when implementing the principles of the circular economy.

Keywords – Circular economy, supply chains, cyclical supply chains.

I. INTRODUCTION

The specific ways of organizing the production processes are commonly referred to as the "Circular Economy"[1]. This type of organization is extremely well received by political and business circles. The main goal of the implementation of the circular economy is expressed in an effort to overcome the shortcomings shown by the traditional linear models of work.

However, academic research and academic literature on the circular economy is still in its infancy and its impact on supply chain management has not been analyzed. The problems and consequences on the management of supply chains have not yet been thoroughly analyzed, regardless of the effort to implement innovations in them to increase efficiency in terms of resource use and to take into account the specifics of a circular economy.

II. THE CURRENT SITUATION

The European "Green Deal", announced by the President of the European Commission, Ursula von der Leyen, envisages making the European Union climate neutral by 2050. This strategic plan envisages a 50% reduction in carbon emissions. The reduction of harmful emissions will be achieved on the basis of universal implementation of the principles of the circular economy (closed-loop economy). Due to the fact that supply chains account for about 4/5 of the harmful emissions released into the atmosphere, their importance in the transition from the principles of the linear economy to the principles of the circular economy can hardly be overestimated. Therefore, the successful implementation of closed-loop systems requires the active involvement of scientists, practitioners and politicians.

The implementation of principles for organizing circular (closed) supply chains, unfortunately, are still in the initial stages of analysis, research and implementation. Determining the cyclical maturity of supply chains is difficult. A

framework concept needs to be developed to analyze the level of maturity of the closed-loop economy in terms of supply chains.

In the extensive and systematic review of the scientific literature[2], which contains a total of 1,372 articles on supply chains, on closed-loop and mature economies, the authors define the following conclusions:

1. The flow of scientific research dedicated to the Circular Economy and cyclical supply chains is increasing;
2. There is currently no analysis of the relationship between the circular economy, supply chains and maturity assessment;
3. The three constructs - organization, products, processes, characterize and influence the maturity of cyclical supply chains;
4. A three-level maturity network that covers six basic elements of the circular economy enables the maturity of a circular supply chain to be assessed.

On the basis of the review of the literary sources, sample proposals (/recommendations) related to the consequences for the development of the so-called "circular supply chains" can be made. They embody the basic principles of the circular economy in the management of supply chains. The recommendations are based on the following arguments:

- a) moving from product ownership to leasing and access to supply chain links;
- b) increased importance of structural flexibility and Startup companies in regional/local supply chains;
- c) open and closed material cycles in technical and biological cycles;
- d) closer cooperation within and beyond the immediate boundaries of industry;
- e) the increase in public and private procurement, especially in the service sector, stimulating the expansion of circular business models.

III. EXPOSITION

The article is a study of the emerging implications for supply chain management (SCM) in the implementation of circular supply chains (CSC). This is caused by the significant growth of interest in the circular economy (CE) from the business community, as well as from practitioners and theorists (EMF and McKinsey & Company, 2012, 2013; EMF et al., 2015;

Yuan et al., 2006; Tukker, 2015; Webster, 2015; WEF et al., 2014) and the relevance of supply chain innovation in the

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transition to CE (Aminoff and Kettunen, 2016).

Based on the literature review, the impact of the circular economy on "circular supply chains" is considered. CSCs can be defined as the implementation of circular economy principles in supply chain management.

The increased interest in the academic community and among practitioners is explained by the deteriorating environmental trends, by the rapidly changing socio-economic relations and by the changes in the normative regulations. The high volatility of energy resource prices caused by increasing demand from emerging modern economies, the increase in the number of middle-class consumers globally entering the market, the increase in the sharing/rental economy of various resources, increasing strictness of regulatory mechanisms on systems that have a serious impact on the environment and on global climate change and on the increase of waste, all raise questions about the economic feasibility of traditional, linear operational business models (supply chains) that profess a "take-make-waste" approach (Accenture, 2014; WEF et al., 2014).

The circular economy focuses on three pillars: economic, environmental and social sustainability.

The sustainable development of SCM and the features of closed-loop supply chains began to be considered in the early 2000s (Linton et al., 2007; Wells and Seitz, 2005).

One of the most popular definitions of SCM is that of Christopher [3]. "Managing upstream and downstream relationships with suppliers and customers delivers superior value to customers at lower costs to the supply chain as a whole".

The traditional understanding of supply chain implies a focus on cost and productivity management, on linear thinking related to the management of "inputs" and "outputs", a focus on relationships between multiple customers and suppliers,

Christopher, M., and Holweg (2011)[4] argue that the SCM principle of end-to-end process control to create a seamless flow of goods must be questioned when assumptions of long-term stability no longer are true. Managing supply chains in an age of constant turbulence involves "viewing volatility as an opportunity rather than as a risk" by recognizing its nature and impact, reducing exposure to risk by using such methods as: dual sourcing, sharing of assets, postponement, flexible staffing, rapid manufacturing and outsourcing.

Implementing a closed-loop or reverse logistics supply chain in business is not easy. The reason is that product recycling is rarely considered a value in the manufacturing system.[5] Closed-loop supply chains began with the implementation of new industry standards and a focus on environmental safety or environmental efficiency. This implied working with suppliers to reduce the environmental impact of products and processes.

When developing closed-loop supply chains, significant investment is required to acquire/provide resources, initially to understand the configurations of information flows and the distribution of their parts that serve the product during its transition through the supply chain, and then to develop a system for collection, accumulation and return of the product to the first node in the supply chain at the end of its life cycle.

The characteristics of circular supply chains are expressed

in:

- a) transition from ownership of the offered service to leasing it to another company together with the access to the nodes in the supply chain;
- b) increasing the importance of the structural flexibility of new entrants in regional (local) supply chains;
- c) implementation of open and closed material cycles in technical and biological cycles;
- d) expansion and closer cooperation within the industrial sector and/or beyond its immediate boundaries;
- e) increase in public and private procurement in the service sector, which represents an opportunity to expand circular business models.

In order to fully exploit the potential of the circular economy and to implement cyclical business models, it is necessary to define appropriate strategies, methods and objectives in the management of supply chains[6]. Realization of the closed-loop economy is possible when a complete overhaul of the traditional strategic, tactical and operational processes in the supply chain is successfully implemented. Based on research in the field of cyclical supply chain management[7], six basic elements can be identified which help define analytical concepts. These basic elements are shown in the following figure and include:

1. R-imperatives;
2. Restorative and regenerative cycles;
3. Sustainability framework,
4. Value focus;
5. Holistic system-thinking;
6. Paradigm shift.

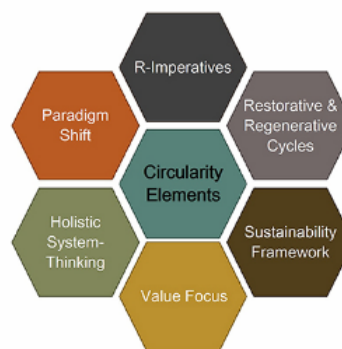


Fig. 1 Elements of the circular supply chain [8]

These basic elements can be located in a maturity grid of three levels (Fig. 2)

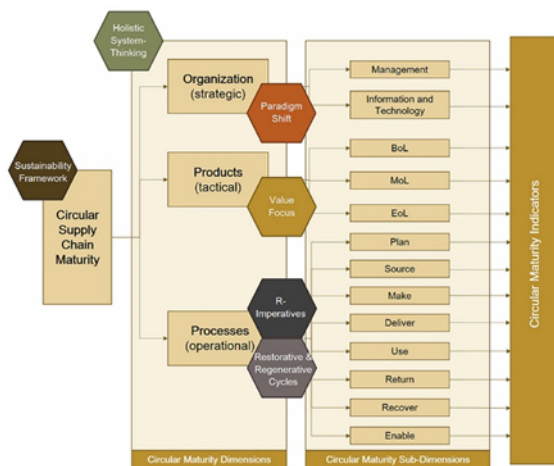


Fig. 2 Maturity of circular supply chains

The proposed maturity grid allows the goal to be defragmented into subtasks. A more formal representation is not possible due to the numerous interrelationships that cannot be precisely and clearly formalized in a model. The first decomposition reveals the first level of structural maturity and allows the measuring of the cyclical maturity of the organization, products and processes. In the second decomposition, these dimensions are split, as a second level, into circular maturity sub-dimensions. The third decomposition (the third level) includes the circular maturity indicators, with the help of which all the characteristics of the circular supply chains that correspond to the maturity level can be qualitatively described.

Strategy

Fundamental decisions related to long-term strategies and the provision of the necessary resources are adopted at the strategic level[9]. The cyclical maturity of the organization has a major role in the realization of the cyclical chains from their planning to their realisation. For this reason, the proposed sub-dimensions of cyclical maturity, within the first dimension, are aimed at satisfying management and information (technological) requirements. These two sub-dimensions play the role of critical success factors in the transition from a linear to a cyclical supply chain.

- **Management:** the dimension includes all critical success factors that can be defined at the level of additional (auxiliary) capabilities – forward-thinking, vision for the development and deep awareness of the concept of cyclical supply chains and the consequences of its implementation, top management support in the implementation of the closed-loop economy, active involvement and participation of all stakeholders in the supply chain and effective planning and compliance with all circular supply chain requirements[10].
- **Information and Technology:** it is assumed that information systems and digital technologies will facilitate the transition to circular supply chains on a large scale. Thus, innovative digital approaches and methods (e.g. the analysis of large volumes of data, their

management and tracking of materials in real time) should be implemented for the initial development of closed supply chains and will also be required for further continuous development [11]. The necessary IT infrastructure that is compliant with all necessary requirements, and a cost-effective information management system, should support the cyclical transition of supply chains to the next higher level in the hierarchy.

Tactics

At the tactical level, medium-term decisions should be adopted that would help the efficient and rational use of available resources of all kinds. According to the ideology of the closed-loop economy, each particular product becomes the center around which decisions are made at this level of the hierarchy[12]. For this reason, adapting product life cycle management is an important component of the method of converting a linear supply chain into a cyclical one. The phases of the product-oriented life cycle can be divided into three:

1. Beginning of the life cycle;
2. Middle of the life cycle;
3. End of life cycle.

Beginning of the life cycle – value creation: during this cycle, several stages of product creation take place, which include product feasibility study (exploration), product design, product development, purchase of machinery (equipment) and production of the product. All are aimed at achieving the goal - cyclical value creation. This includes circular product design, which allows resource cycles to be slowed down and closed[13]. Products must be designed to be durable, renewable, upgradeable, and repairable. Procurement should be very seriously focused on suppliers who are actively involved in the transition to cyclicity. Particular importance (value) is acquired by those of them who are able to offer replacement of traditional materials with those that are the result of processing or those that offer bio and eco products. All companies that offer materials and components with a minimal impact on the environment and are ready for cooperation with other companies in the various sectors of the economy. Industrial production itself needs to provide value in lowering the volumes and costs of energy and environmentally neutral (non-toxic) material, thus increasing productivity.

Middle of the life cycle - store of value. This cycle includes the stages related to packaging and storage, distribution and transportation of the goods (product), use of the product as intended, service during operation and maintenance of the product. During this stage of the life cycle, it is necessary to consider and analyze the extent to which the mechanisms designed to preserve the value match the defined criteria for effective management. Examples for such mechanisms are reusable or recyclable packaging, mechanisms for product service, mechanisms for return and exchange of the product, mechanisms for modernization, for service and for reuse. All this is necessary to achieve a high intensity in the use of the product[14].

End of Life Cycle - Extending Value. This stage is key to closing the loop after the user stops using the product. The stages that represent the collection, sorting and processing of end-of-life products must be organized and carried out cost-effectively. Only this can lead to an increase in the existing value of the product. This requires building a reverse logistics infrastructure that is able to provide cost-effective collection, return, sorting and separation. This is particularly important for biological, food and technical substances.

The main goal is to achieve 100% economic profitability of the product.

Processes

Several business process structures have been developed in order to structure supply chain management processes[15].

An overview framework can be used to gain a comprehensive view of supply chain management operations. The Supply Chain Operations Reference ("SCOR") model [16], can be used as a basis for such an integrated approach, which is considered by academics and engineering practitioners as the standard basis for supply chains.

The SCOR model includes processes that reside at three hierarchical levels: Level 1 consists of six different management processes: planning, sourcing, production, delivery, return and enablement (activation) [17]. The identified management processes are then divided into Level 2 process categories and Level 3 process elements of the SCOR model.

The SCOR model allows the processes in supply chains to be described. This is confirmed by the frequent use of the method in practice.

This helps to bridge the boundaries between corporate divisions that are functionally oriented and also between different companies in the supply chain. In this way, the supply chain is supported in defining, designing and implementing the supply chain processes.

Like many other modeling approaches, the SCOR model is limited by description and does not provide for explanatory notes. The process hierarchy refers to the individual organizations in the supply chain.

The relationships between firms in cyclical supply chains are built on the basis of binding model specifications associated with the companies. In addition to continued development, there are various proposals for changes.

For example, the expanded use of the SCOR model designed to include the processes under consideration would lead to increased benefits for all participants. Some authors[18] suggest that Level 1 SCOR processes be applied to cyclical supply chains and to also add three processes: 1. Utilization, 2. Recovery and 3. Incorporation:

- The process plan balances all the demands on the cyclical supply chain and on the firm's own resources and assets. The circular business approach requires that all constraints imposed by the environment (eg the assimilation capacity of the environment) be taken into account when developing the supply chains[18].
- The purpose of the process creator is to enable product deliveries to be planned, products to be received and

inspected, delivered to the customer, payments to suppliers to be approved[19]. Supply chain management in the circular economy is oriented towards the use of alternative materials that have less impact on the environment. The materials chosen must be able to be easily returned, disassembled and recycled.

- Process management involves planning of production processes. The process also includes the management of packaging and waste[19], which are central sub-processes in the circular economy.
- The process of supply management includes not only the delivery of the products to the end users, but also the organization of the supply of spare parts for maintenance during the use of the product, in order to increase their life.
- Process management includes the use of the product by the customer and the process required to store and restore the product in order to fulfill its inherent functions.
- Product return describes the process of collecting and delivering end-of-life products to locations and facilities designed for the processing and recovery of returned waste. In this case, the end user is considered as the source of raw materials. Companies must develop specific programs for the buy-back, transport and processing of waste[20].
- The recovery process includes the activities associated with recovery, reuse, remanufacturing, refurbishing and recycling.
- Supply chain management must meet the challenges of the circular economy[21]. This process enables focus on communication with companies and customers. This unifying process includes, for example, the traceability of material flows.

IV CONCLUSION

The theory of development of the circular economy and in particular the theory of circular supply chains needs to be analyzed and systematized. This sets the stage for a subsequent causal relationship between circular economy practices and sustainable goals. The importance of the implementation of cyclical supply chains must be assessed, taking into account the specifics of the company to achieve its strategic goals and to achieve sustainable development. The question of moving from linear to cyclical supply chains requires a comprehensive and thorough analysis of the context of the competitive business environment. A concept and roadmap for optimizing the circular economy at the supply chain level needs to be developed.

The maturity model of cyclical supply chains needs to be further operationalized by developing criteria (quantitative) for the third level (circular maturity indicators). The pilot project for the first cyclical supply chain must take into account the wide diversity of companies, in terms of size and sector of the economy, and the huge variety of goods produced, in order to respond, to the greatest extent, to all interested companies. Supply chains are often defined as

networks that have decentralized control without the presence of a leading focal company. This greatly complicates the assessment of cyclicity. The assessment of the individual dimensions of maturity can be determined on the basis of expert judgments.

Circular supply chains contribute holistically to the sustainable development of the circular economy, contributing to immediate effects from an ecological point of view, which then spread to the economic and social spheres. Conducting an assessment of the maturity level of cyclical supply chains underlies the development of individual roadmaps for the chains. For the effective management of the supply chain, a system of actions, fully reflecting its maturity level, needs to be developed. This will increase the value of the tools to practitioners.

The transition from linear to circular economy and from linear to circular (cyclical) supply chains will be accompanied by successes, failures, and accumulation of practical experience. For design and implementation, cyclical supply chains need an appropriate toolkit. The Circular Supply Chain Maturity Framework can be used as such a tool.

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Modeling of a Production Costs Implementation Analysis Algorithm

Radi Dimitrov¹

Abstract – The object of the present study is the production activity of industrial economic entities. The main goal is to modeling an algorithm for the analysis of the implementation of production costs by industrial enterprises in the conditions of Industry 4.0. The research focuses on the production costs that are realized in the implementation of the production programs. The toolkit of the specified algorithm is based on a deterministic combined approach to the analysis of the forecast-result and factor indicators of production costs.

Keywords – analysis algorithm, production costs, manufacturing

I. INTRODUCTION

With the modern digitization of the processes of management and monitoring of the results of the realization of the production capacities of the industrial enterprises, the efficiency of the use of the production capacity is improved, including the technological capacity, the volume of the manufactured products and the costs incurred for the production. As part of the above, the objective planning and implementation of production programs has an impact on the production process. In this order, each industrial enterprise should implement an appropriate algorithm for the analysis and evaluation of the implementation of the costs under these programs.

The object of the present study is the production activity of industrial economic entities. The research focuses on the production costs that are realized in the implementation of the production programs.

The main goal is to modeling an algorithm for the analysis of the implementation of production costs by industrial enterprises in the conditions of Industry 4.0.

The exposition of the present development is limited to the study of costs related to the production of output by industrial enterprises, as well as their estimated values, results and factor indicators.

The study complies with the legal regulations of national and European legislation as of July 31, 2022.

II. EXPOSITION

Business information systems represent the modern digital approach to managing the activity of the industrial enterprise, including: organization, implementation and control of the production process, volume indicators, supplies, financial status, accounting reporting, etc. From a theoretical-

methodological point, Pl. Pavlov determined that the main goal of these systems is the effective management of the company's resources, aimed at maximizing the financial results [1]. In this regard, in the implementation of the production process, the business information systems are applied, which carry out effective management and monitoring of the same process from its entry point to obtaining the final result - the actual manufactured product, and even to its realization. In order to make adequate management decisions, it is necessary to implement indicators and coefficients in business information systems that represent the financial status and the effect of the implementation of each production program.

The production program should be understood as the volume of production, expressed in quantity of the manufactured product, by individual types, for a certain period of time (week, month, quarter, year). During the implementation of the production program, the ratio between the forecasted and realized production costs should be monitored. In fulfillment of this, in the study is modeled an algorithm for the analysis of the implementation of production costs, applying a specific toolkit.

The toolkit of the algorithm is based on a deterministic combined approach to the analysis of the forecast-result and factor indicators of production costs. With the specificity of these costs and due to the fact that for the purposes of the analysis, the same or comparable measures of forecast, result and factor quantities should be used, the author applies the value (monetary) measures of the reporting data as a basis for the metrification of the production process.

The algorithm for analysing the implementation of production costs is modeled by applying a deductive approach, which includes the following stages of analytical procedures:

- Metrification of the level of production costs by deriving a coefficient of implementation that measures the effect of the input (invested) costs for the implementation of the production process for the current period, compared to the planned production costs when introducing the production program for the same period. The dynamics of production costs are also established, which is measured by the variation between the performance coefficient of these costs for the current period compared to the period taken as a base;

- Metrification of the effects of the application of the factor indicators of the production costs with the help of the coefficient of implementation, modeled in the first stage. The level of the coefficient of implementation of factor indicators is measured by comparing the effect of input costs by individual types, calculated during the implementation of the production process for the current period, against the planned

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by individual types of production costs when the production program is introducing for the same period. In addition, the dynamics of factor indicators of production costs are also measured, which is measured by the variation between the coefficient of implementation of these costs for the current period compared to the base period.

1. Metrification of the level and dynamics of implementation of production costs

The first stage of the algorithm for the analysis of the implementation of the production costs involves measuring the level and dynamics of the performance of these costs. For this purpose, a coefficient of implementation of production costs is applied, which compares the actually realized costs during the implementation of the production process in a specific period, compared to the planned production costs when introducing the production program for the same period.

Regarding the level of the coefficient of implementation of production costs, it can be measured both in absolute and relative value. To establish it in absolute value, the following formula is applied:

$$Cp_j^n = \frac{C_j^n}{PC_j^n}, \quad (1)$$

where:

Cp_j^n is the coefficient of implementation of production costs of type "j" for period "n";

C_j^n is the value of realized production costs of type "j" for period "n";

PC_j^n is the value of planned production costs of type "j" when compiling the production program for period "n".

The level of the coefficient of implementation of production costs in relative value is measured by applying the formula:

$$Cp_j^n\% = \frac{C_j^n}{PC_j^n} \times 100 \quad (2)$$

On the basis of the metrification of the level of the coefficient of implementation of the production costs, it is established to what extent the planned costs for the realization of the production program have been fulfilled. The level of the coefficient of implementation of production costs presents the results of the production process in a consolidated form. The obtained results in the value of this coefficient can be diagnosed in the following generalized form:

➤ if the absolute value of the coefficient equal to 1 (resp. relative equal to 100%), it is assumed that the industrial enterprise has fulfilled its production program according to plan;

➤ if the absolute value of the coefficient more than 1 (resp. relative more than 100%), it is assumed that the enterprise has exceeded the production program, or objective circumstances have arisen on the basis of which additional costs have been incurred under this program. In this case, the specific reasons for the over-implementation should be

investigated, on the basis of which, in the event of the realization of the objective circumstances, the planned cost indicators of the program should be updated or optimization of the same should be carried out.

➤ if the absolute value of the coefficient is less than 1 (resp. relative less than 100%), it is assumed that the enterprise has not fulfilled its production program or optimization has been implemented by minimizing the value results of some of the factor indicators of production costs.

In order to measure the dynamics of the coefficient of implementation of production costs, the value of the same, reported for the current period, should be compared with its value during the period taken as the base. In this way, the change in the level of implementation of the costs of the production program is established, which is metrified by applying the following mathematical expression:

$$\Delta Cp_j = Cp_j^1 - Cp_j^0 \quad (3)$$

where:

ΔCp_j is the dynamics of the coefficient of implementation of the production costs of type "j";

Cp_j^1 is the coefficient of implementation of production costs of type "j" for the current period;

Cp_j^0 is the coefficient of implementation of production costs of type "j" for the base period.

The presented formula can be detailed by applying the factor indicators that structure the coefficient of implementation of the production costs: the value of the realized costs for the production (C) and the estimated value of the production costs when introducing the production program (PC). In this situation, the mathematical formula acquires the following expression:

$$\Delta Cp_j = \frac{C_j^1}{PC_j^1} - \frac{C_j^0}{PC_j^0} \quad (4)$$

Based on the measured values in the dynamics of coefficient of implementation of the production costs, the following conclusions can be presented:

➤ if the value of the coefficient is a positive value, it means that the enterprise realizes more optimally the costs planned according to the production program during the current period. The above, in turn, is a prerequisite for claiming that the enterprise plans and implements production costs optimally.;

➤ if the value of the coefficient is a negative value, it means that the enterprise realized more optimally the costs planned according to the production program during the base period. The indicated, in turn, implies a thorough analysis of the factor indicators, on the basis of which to optimize the costs of the production program for the next period.

The study of the specific reasons for the established value results in terms of the level and dynamics of the implementation of production costs, as well as deviations from the production program of the industrial enterprise, implies a deeper study of the factors of the structure of the

coefficient of implementation presented above, which can be implemented by detailing the cost structure by individual factor indicators.

2. Metrification of the level and dynamics of the implementation of factor indicators of production costs

The second stage of the implementation analysis algorithm focuses on the individual factor indicators, part of the costs structure, realized for the implementation of the production process. The production costs can be classified on the basis of their accounting belonging to the costs of the main (operating) activity, through which the actual cost of the manufactured product is calculated, as follows:

- Energy intensity costs (costs for energy sources and fuels);
- Costs of material intensity (costs for materials and resources for production);
- Costs for external support of the production process (costs for external services related to the provision of the production process);
- Costs for operation (depreciation) of production facilities (machines and equipment), including operation of durable tangible and intangible assets;
- Labor costs of the personnel employed in the production process, including costs for remuneration and insurance at the expense of the employer;
- Other costs related to the implementation of the production process;
- Costs of technological marriage related to the implementation of the production program;
- General production costs, including the fixed and variable costs of the industrial enterprise, which are carried out during the implementation of the production activity, but they are not directly involved in its process.

By individually approving the factor indicators in the mathematical formula for calculating the level of the coefficient of implementation of the production costs by individual types, it measures the degree of implementation of each of these costs separately. For this purpose, mathematical expressions similar to those presented in the following are applied:

Regarding the costs of energy intensity, the value of the incurred costs for individual sources of energy and fuel should be compared to the estimated value of these costs. To establish the level of the coefficient of implementation of energy intensity costs, the formula is applied:

$$Cp^n(Cen) = \frac{Cen^n}{PCen^n} \quad (5)$$

where:

$Cp^n(Cen)$ is the coefficient of implementation of the costs of energy intensity during period "n";

Cen^n is the value of the costs incurred for energy intensity during period "n";

$PCen^n$ is the value of the planned costs for energy intensity during period "n".

When measuring the dynamics of the coefficient of implementation of the energy-intensive costs, the variation between the value of the same, reported in the current period, compared to the value for the base period should be determined using the mathematical expression:

$$\Delta Cp(Cen) = Cp^1(Cen) - Cp^0(Cen) \quad (6)$$

where:

$\Delta Cp(Cen)$ is the dynamics of the coefficient of implementation of the costs of energy intensity;

$Cp^1(Cen)$ is the value of the coefficient of implementation of the costs of energy intensity for the current period;

$Cp^0(Cen)$ is the value of the coefficient of implementation of the costs of energy intensity for the base period.

For the costs of material intensity, the value of the incurred costs for individual types of materials and resources needed to ensure the production process should be compared to the estimated value of these costs. The following mathematical expression is applied to establish the level of the coefficient of implementation of costs of material intensity:

$$Cp^n(Cm) = \frac{Cm^n}{PCM^n} \quad (7)$$

where:

$\Delta Cp(Cm)$ is the dynamics of the coefficient of implementation of the costs of material intensity;

$Cp^1(Cm)$ is the value of the coefficient of implementation of the costs of material intensity for the current period;

$Cp^0(Cm)$ is the value of the coefficient of implementation of the costs of energy material for the base period.

When measuring the dynamics of the coefficient of implementation of the material-intensive costs, the variation between its value recorded in the current period and its value in the base period should be determined using the mathematical expression:

$$\Delta Cp(Cm) = Cp^1(Cm) - Cp^0(Cm) \quad (8)$$

where:

$\Delta Cp(Cm)$ is the dynamics of the coefficient of implementation of the costs of material intensity;

$Cp^1(Cm)$ is the value of the coefficient of implementation of the costs of material intensity for the current period;

$Cp^0(Cm)$ is the value of the coefficient of implementation of the costs of material intensity for the base period.

Regarding the costs of external support, coefficient of implementation should be metrified by comparing the value of realized costs for external services provided by suppliers in connection with the execution of the production process against the estimated value of these costs. To establish the level of the coefficient of implementation for external support costs, the formula is applied:

$$Cp^n(Ces) = \frac{Ces^n}{PCes^n} \quad (9)$$

where:

$Cp^n(Ces)$ is the coefficient of implementation of the costs of external support of the production process during period "n";
 Ces^n is the value of the costs of external support of the production process during period "n";
 $PCes^n$ is the value of the planned costs of external support of the production process during period "n".

To measure the dynamics of the coefficient of implementation of the costs for external support of the production process, the variation between the value of the same, reported in the current period versus its value in the base period, should be determined using the formula:

$$\Delta Cp(Ces) = Cp^1(Ces) - Cp^0(Ces) \quad (10)$$

where:

$\Delta Cp(Ces)$ is the dynamics of the coefficient of implementation of the costs of external support;
 $Cp^1(Ces)$ is the value of the coefficient of implementation of the costs of external support for the current period;
 $Cp^0(Ces)$ is the value of the coefficient of implementation of the costs of external support for the base period.

For the costs of operating the production equipment, coefficient of implementation should be metrified by comparing the value of the realized costs for depreciation of individual types of production equipment, including fixed material and non-material assets involved in the production process, against the estimated value of these costs. To establish the level of the coefficient of implementation of the costs of operating the production equipment, the formula is applied:

$$Cp^n(Cop) = \frac{Cop^n}{PCop^n} \quad (11)$$

where:

$Cp^n(Cop)$ is the coefficient of implementation of the costs of operating the production equipment during period "n";
 Cop^n is the value of the costs of operating the production equipment during period "n";
 $PCop^n$ is the value of the planned costs of operating the production equipment during period "n".

In order to measure the dynamics of the coefficient of implementation of the costs of operating the production equipment, the variation between the value of the same, reported in the current period versus its value in the base period, should be determined using the formula:

$$\Delta Cp(Cop) = Cp^1(Cop) - Cp^0(Cop) \quad (12)$$

where:

$\Delta Cp(Cop)$ is the dynamics of the coefficient of implementation of the costs of operating the production equipment;
 $Cp^1(Cop)$ is the value of the coefficient of implementation of the costs of operating the production equipment for the current period;
 $Cp^0(Cop)$ is the value of the coefficient of implementation of the costs of operating the production equipment for the base period.

With the costs of labor intensity, the value of the incurred costs for the remuneration of the individual structural units and staff positions involved in the production process should be compared to the estimated value of these costs. The following mathematical expression is applied to establish the level of the coefficient of implementation of labor intensive costs:

$$Cp^n(Clc) = \frac{Clc^n}{PCLc^n} \quad (13)$$

where:

$Cp^n(Clc)$ is the coefficient of implementation of the costs of labor intensity during period "n";
 Cop^n is the value of the costs of labor intensity during period "n";
 $PCop^n$ is the value of the planned costs of labor intensity during period "n".

To measure the dynamics of the coefficient of implementation of labor intensive costs, the variation between the value of the same, reported in the current period versus its value in the base period, should be determined using the mathematical expression:

$$\Delta Cp(Clc) = Cp^1(Clc) - Cp^0(Clc) \quad (14)$$

where:

$\Delta Cp(Clc)$ is the dynamics of the coefficient of implementation of the labor intensive costs;
 $Cp^1(Clc)$ is the value of the coefficient of implementation of the labor intensive costs for the current period;
 $Cp^0(Clc)$ is the value of the coefficient of implementation of the labor intensive costs for the base period.

With regard to other costs for the realization of the production process, the value of the incurred costs should be compared based on the individual types and sources of implementation, against the estimated value of these costs. To establish the level of the coefficient of implementation of other costs for the realization of the production process, the formula is applied:

$$Cp^n(Coth) = \frac{Coth^n}{PCoth^n} \quad (15)$$

where:

$Cp^n(Coth)$ is the coefficient of implementation of the other costs during period "n";

Cop^n is the value of the other costs during period "n";
 $PCop^n$ is the value of the planned other costs during period "n".

When measuring the dynamics of the coefficient of implementation of other costs for the realization of the production process, the variation between the value of the same, recorded in the current period versus its value in the base period, should be determined using the mathematical expression:

$$\Delta Cp(Coth) = Cp^1(Coht) - Cp^0(Coht) \quad (16)$$

where:

$\Delta Cp(Coht)$ is the dynamics of the coefficient of implementation of the other costs;

$Cp^1(Coht)$ is the value of the coefficient of implementation of the other costs for the current period;

$Cp^0(Coht)$ is the value of the coefficient of implementation of the other costs for the base period.

For the costs of technological marriage, the value of the incurred costs of technological marriage, based on the types of sources of occurrence of the technological marriage, should be compared against the estimated value of these costs. The following mathematical expression is applied to establish the level of the coefficient of implementation of the costs of technological marriage:

$$Cp^n(Ctm) = \frac{Ctm^n}{PCtm^n} \quad (17)$$

where:

$Cp^n(Ctm)$ is the coefficient of implementation of the costs of technological marriage during period "n";

Ctm^n is the value of the costs of technological marriage during period "n";

$PCtm^n$ is the value of the planned costs of technological marriage during period "n".

In order to measure the dynamics of the coefficient of implementation of technological marriage costs, the variation between its value recorded during the current period and its value during the base period should be determined using the mathematical expression:

$$\Delta Cp(Ctm) = Cp^1(Ctm) - Cp^0(Ctm) \quad (18)$$

where:

$\Delta Cp(Ctm)$ is the dynamics of the coefficient of implementation of the costs of technological marriage;

$Cp^1(Ctm)$ is the value of the coefficient of implementation of the costs of technological marriage for the current period;

$Cp^0(Ctm)$ is the value of the coefficient of implementation of the costs of technological marriage for the base period.

With regard to general production costs for the implementation of the production process, the value of the

incurred costs should be compared based on the individual types of general production costs (fixed, variable, costs from auxiliary activities, etc.), against the estimated value of these costs. To establish the level of the coefficient of implementation of general production costs, the formula is applied:

$$Cp^n(Cgpc) = \frac{Cgpc^n}{PCgpc^n} \quad (19)$$

where:

$Cp^n(Cgpc)$ is the coefficient of implementation of the general production costs during period "n";

$Cgpc^n$ is the value of the general production costs during period "n";

$PCgpc^n$ is the value of the planned general production costs during period "n".

To measure the dynamics of the coefficient of implementation of general production costs, the variation between the value of the same, recorded in the current period, and its value in the base period should be determined using the mathematical expression:

$$\Delta Cp(Cgpc) = Cp^1(Cgpc) - Cp^0(Cgpc) \quad (20)$$

where:

$\Delta Cp(Cgpc)$ is the dynamics of the coefficient of implementation of the general production costs;

$Cp^1(Cgpc)$ is the value of the coefficient of implementation of the general production costs for the current period;

$Cp^0(Cgpc)$ is the value of the coefficient of implementation of the general production costs for the base period.

With the designed algorithm for the analysis of the implementation of production costs in industrial enterprises, a sufficient level of detailing of the degree of the level and dynamics of the implementation of the same costs is achieved, both in general and by individual factor indicators and their constituent elements on the overall production process. It should also be applied in the planning of the production program by the industrial entity. In this order, through the application of the present algorithm, the degree of realization of the production program is established by comparing the reported versus the planned indicators. The algorithm can be tested in business information systems when calculating the actual cost of production by industrial enterprises. In this way, better efficiency will be achieved in the management and monitoring of the production process through the application of modern business information systems.

III. RESULTS

The study presents an algorithm for the analysis of the implementation of the costs of the production programs, which is modeled by applying a deductive approach, which includes the following stages of the analytical procedures:

The first stage measures the level of production costs by deriving a coefficient of implementation, which measures the

effect of the input (invested) costs for the implementation of the production process for the current period, compared to the planned production costs when introducing the production program for the same period. Also at this stage, the dynamics of production costs is established, which is measured by the variation between the coefficient of implementation of these costs for the current period, compared to the period taken as a base.

The second stage presents analytical procedures to measure the effects of the performance of the factor indicators of production costs through the coefficient of implementation modeled in the first stage. The analytical procedure for measuring the level of the coefficient of implementation of the factor indicators is carried out by comparing the effect of the input (invested) costs by individual types, calculated during the realization of the production process for the current period, against the planned by individual types of production costs when compiling the production program for the same period. An analytical procedure is performed to measure the dynamics of the factor indicators of production costs, which is measured by the variation between the coefficient of implementation of these costs for the current period compared to the base period.

IV. CONCLUSION

From the exposition of the present study, it can be summarized that with the design of an adequate algorithm for the analysis of the implementation of production costs, better efficiency of the processes of management and monitoring of the main costs of production is achieved.

In a theoretical-methodological and in a practical-applied aspect, the present study achieves results related to establishing the level and dynamics of production costs by deriving a coefficient of implementation, which measures the effect of the input (invested) costs for the realization of the production process for the current period, compared to the planned production costs when introducing the production program for the same period. This coefficient is measured by means of a specific mathematical apparatus developed, which also includes the metrication of the cause-and-effect relationships for the implementation of the costs of the production program of the industrial enterprise, by factor indicators.

The algorithm for analyzing the performance of production costs can be improved by including value indicators to measure the financial results and the added value of the realized production process, which will achieve the improvement of financial management and control, as well as process optimization on monitoring of the performed activities.

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Concept for Digital Business Model in Sales of Fertilizers

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Abstract – The need to digitize classic business models is increasingly becoming the basis for companies' business success. A business model is the basic logic of a company that describes what benefits are provided to customers and partners. In this sense author, recommend a concept for business model digitalisation in Chemical Industry. The conception is based on The St. Gallen Business Model Navigator™.

Innovations in this research concern creative techniques application in order to new ideas generation and improvement of current business model. The objective is to combine the business model elements in such a way that they mutually reinforce each other. This makes it possible to achieve growth and makes imitation by competitors difficult.

Keywords – Business model, Innovation, Digitalization, Platform, Fertilizers.

I. INTRODUCTION

Today we are witnessing a digital transformation in our real life and in our business. There are four core areas where new transformation has the biggest effect. Each of these areas requires its own particular specialization:

- Financial area: The ability to collect and use financial data to generate insights that inform intelligent decision making regarding items like cash flow, profitability, and growth, as well as quality and productivity.
- Customer area: The understanding of who your customers are and how to attract, find, reach, and connect with them, through the lenses of sales and marketing, customer support and services, and partner and supplier relationships.
- Data area: The creation of standardized internal processes, procedures, systems, and activities across an organization made transparent and universally comprehended through collaboration and the communication of timely visual data. This cohesive approach enables transformative, value-creating decisions.
- Mastermind area: The brainstorming of ideas and solutions in a nonjudgmental, well- respected environment. It is about empowering employees to be innovative, engaging partners and customers, and finding ways to support those partners and customers you've connected with.

All these areas refer to digitalization of business models. For a very long time, digitalization within the manufacturing sector has focused on optimizing the existing business. Today, digital business models have become key to setting one's

business apart from the competition. These digital business models focus on providing new value propositions based on the use of smart products.

These value propositions are created by combining smart products with related services, which are based on the data that is generated in real time during the operation of the product. In a future not far from now, we will be able to use artificial intelligence to process this kind of operating data. This will lead to the development of a completely new era of value creation and to higher shares of profits and market shares being created from data driven business models. [1]

Core to successful business strategies is increasingly a value proposition to the customer that addresses their respective needs in a personalized way. [2] Real-time analysis of products' operational data enables services to be tailored to fit customers' circumstances and needs. Models such as 'as-a-service' or 'pay-per-use' enable the provision and billing of services according to the availability ('pay-per-hour'), productivity ('pay-per-piece') or functionality ('pay-per feature') of the respective service. [2] Depending on the context, this results in a variety of options for designing data centric business models that promise significant added customer value beyond the actual core of the service.

On the other hand, innovation is a challenge for research teams, small, medium and large industrial companies and economies as a whole as it is viewed as a catalyst for competitiveness in an increasingly competitive world.

II. THEORETICAL FINDINGS

A. Definition of business model

Today customers are more and more looking for solutions and benefits. In an attempt to understand and answer the customers' problems, the manufacturing industry in general is increasingly adding services to their products to create holistic and individual solutions. [7] While in the beginning the physical product has just been extended with some basic services, the value share of services is now increasing to parity with the product and beyond. Such an offering of complementary product and service components is viewed as an extended product. [4]

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A business model is the basic logic of a company that describes what benefits are provided to customers and partners. A business model answers the question of how the provided benefits flow back into the company in the form of revenue. The created value enables a differentiation from competitors, the consolidation of customer relationships, and the achievement of a competitive advantage. A business model involves the following dimensions and elements:

- The customer dimension contains the customer segments, customer channels, and customer relationships.
- The benefit dimension includes products, services, and values.
- The value-added dimension includes the resources, skills, and processes.
- The partner dimension includes the partner, partner channels, and partner relations.
- The financial dimension includes the revenues and expenses.

The objective is to combine the business model elements in such a way that they mutually reinforce each other. This makes it possible to achieve growth and makes imitation by competitors difficult. [5]

In the research, author use The St. Gallen Business Model Navigator™ (Fig.1). The business model architecture includes:



Fig. 1. The St. Gallen Business Model

Who: defines the target customer/ market.

What: describes what is offered to the target customer, or, put differently, what the customer values. This notion is commonly referred to as the customer value proposition.

How: to build and distribute the value proposition, a firm has to master several processes and activities. These processes and activities, along with the involved resources and capabilities, plus their orchestration in the focal firm's internal value chain.

Value: explains why the business model is financially viable, thus, it relates to the revenue model. In essence, it unifies aspects such as, for example, the cost structure and the applied revenue mechanisms, and points to the elementary question of any firm, namely how to make money in the business.

By answering the four associated questions and explicating (1) the target customer, (2) the value proposition towards the customer, (3) the value chain behind the creation of this value, and (4) the revenue model that captures the value, the business model of a company becomes tangible and a common ground for its re-thinking is achieved. A central virtue of the business model is that it allows for a holistic picture of the business by combining factors located inside and outside the firm.

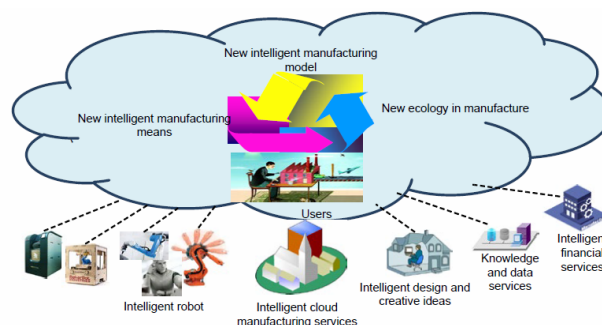


Fig. 2. New smart production models, means and forms [3]

B. Innovations

Innovations in business model can be viewed via The St. Gallen Business Model Navigator™. They have to be applied at least two of the elements (who, what, how and value) in order to ensure efficiency. Innovations can be done in four areas according to Business Model Innovation Framework of Ramdani et al., 2019 (Fig.2): [6]

- Innovations in the field **Value proposition (Why)** include innovations in core offering, in target customers, in customer needs or in perceived customer value.
- Innovations in the field **Operational value (What)** include innovations in key assets, in key process, in partner network or in distribution channels.
- Innovations in the field **Financial value (How)** include innovations in revenue streams, in cost structure, in cash flow or in margins.
- Innovations in the field **Human capital (Who)** include innovations in organisational learning, in skills & competences, in incentives or in training.



Fig. 3. Business Model Innovation Framework [6]

III. EXPERIMENTS

The business models of two competitors of company X in Bulgaria were examined. [8, 9]

One producer (company A) operates in Bulgaria, and the second competitor (company B) is a distributor of a global producer of fertilizers.

Company A is a manufacturer and sells fertilizers through its own sales department. There is one plant in the country. There are no subsidiaries.

Company B is a commercial company that accepts samples for analysis through the Norwegian manufacturer's laboratory. Sales are carried out through its sales department and regional representatives. It does not have a plant on the territory of Bulgaria.

Company X is a manufacturer and marketer of fertilizers and has one plant in the country. There is a subsidiary company for sales in Bulgaria and a sales department for sales abroad. It has web based customer application through which information can be obtained regarding current product prices, stock market and supply movement. If you are not client of company X you can't receive information for prices or send query. Also, company X has own laboratory for analysis and regional consultants for agronomic services.

All three companies receive orders via email or telephone. Offers are prepared from employees. Between departments in the company purchase fulfillment are organized via emails, telephones and paper orders.

The research includes steps as follows:

- Ecosystem analyzing- target customers, partners, competitors, key technologies, local and megatrends and relationships.

- Innovations (new ideas generation)- problems observing, brainstorming and application of other creative thinking techniques.
- Concept definition.
- Implementation- internal and external.
- Testing and optimization- improvements and settings.

The last two steps will be applied after acceptance of the concept by the executive board.

Participants in research were employees from trade department and trade company as well as from ICT department and executives also. The workshops were held at Company X for three months.

Innovations in this research concerned creative techniques application in order to new ideas generation and improvement of current business model. The starting point was problem observing. Next, was combining the business model elements in new way that they mutually reinforce each other. This makes growth and difficult to imitate by competitors.

IV. RESULTS

Author of the research suggests improvement of web based customer application of company X.

After interviews and workshops with employees in the company, conception for digital platform was generated.

State of the art

Producer sells his products via its trade company and international trade department. Distribution are organized by own logistic department. Prices of products depend on quantities and delivery distances.

SUGGESTED BUSINESS MODEL

Trade company can offer an online shop for the procurement of different fertilizers. The other participants in the model are Fertilizer producer and service providers. Trade company monitors the quality of deliveries and customer satisfaction.

There is no auction mechanism on trade company, but it arranges orders, where the manufacturing partner can accept or reject the order. After delivery, buyer issues an invoice to trade company and then order is invoiced from producer to it too.

Value network

Sequence of order request:

- 01- Buyer send request via online shop
- 02- Trade company (platform operator) send to him offer, which is done by algorithm within 2 hours
- 03- Buyer send order for purchase to Trade company
- 04- Trade company send to buyer order confirmation
- 05- Trade company send order to logistic department
- 06- Logistic department prepared and fulfil delivery (gets in touch with manufacturing partner and transport service operators)

Value proposition

- for platform operator is ability for almost immediate respond.

- for logistic department/ manufacturing partner is ability for receiving orders via the platform and to benefit from additional orders without any sales effort.

- for buyer is benefit from fast offering of the online shop and – in the case of an order – a takeover of the complete transaction through the platform.

Revenue mechanism

- The operator of the platform is paid for the production and delivery of produced products. He does not receive any fees for brokering or providing an offer. The strategy of enhancing over the critical mass is necessary.

- The buyer pays to the operator of the platform for production and its delivery.

- The provider of manufacturing services is paid by the operator of the platform for production.

Business model innovation

The operator of the platform is a new player with a new business model in the value network of manufacturing industries.

The business model of a buyer is not innovated.

The business model of the provider is innovated: The company provides the same value proposition and does not change the revenue mechanism, but the company has the operator of the platform as an additional customer channel and changes the value network because of the connection to the platform.

V. CONCLUSION

The paper presents a concept for a digitized business model for the sale of fertilizers. Employees from different departments of company X are involved in the construction of the concept. The stages it went through are the following: Ecosystem analyzing, Innovations (new ideas generation) and Concept definition. Implementation and Testing and optimization are the last steps which can be applied after acceptance of the concept by the executive board.

The limitations of the concept are:

- Applicability to manufacturing enterprises.
- Availability of a trading company, which may be a subsidiary or partner of the manufacturer.
- Availability of a logistics department at the manufacturer.

Future research of the author of the paper will be devoted to the practical application, testing and optimization of the proposed concept.

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Impact of COVID-19 on Alternative Urban Mobility and Transport Services

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Abstract – the current study examines the impact of the COVID-19 pandemic on urban mobility in the city of Sofia, Bulgaria. Special attention was paid to the so-called "green" alternatives for moving in an urban environment and their current usage is analyzed. Some of the future trends for urban mobility and transport services are discussed.

Key words – alternative transport, urban mobility, green transport, transport services, COVID-19.

I. INTRODUCTION

In modern society, an increasing part of the population is located in cities, and this trend is expected to rise. Creating a prerequisite for searching for public transport (bus, trolleybus, tram transport, metro and others), taxi services, mobile electric scooters, bicycles and others.

At the same time, in the context of the COVID-19 pandemic, more and more people are turning to alternatives for individual mobility (taxi services, electric scooters, bicycles, etc.) that provide social distance and have relatively little or no negative impact on the environment.

The European Commission is working on several strategies in this direction. On the one hand, there are strategies for urban mobility and accessibility of this type of transport for citizens with lower income, and, on the other, there is the strategy for reducing harmful emissions. The so-called "Green Deal" aims to reduce harmful emissions by 90% by 2050 by switching to more sustainable transport means putting consumers first and providing more affordable, healthier and cleaner alternatives [1].

Inevitably, this will also lead to changes in the way of providing not only urban transport alternatives for citizens' mobility, but also in the transportation of various goods and services, which will affect urban and intercity courier/postal services.

The **main objective** of the present study is to establish the current usage of the so-called "green" transport on the territory of the city of Sofia and its potential for development.

The following tasks are listed:

- ✓ Analyzing the current consumption and popularity of electric scooters and cars as an alternative for urban mobility;
- ✓ Examining the price elasticity of demand for this type of service;

- ✓ Analyzing citizen proposals regarding "green" urban transport;
- ✓ Revealing prospects and problems for other transport services.

II. RESEARCH METHODOLOGY AND ANALYSIS

The present research is based on a previous one by the author [2], which was conducted in an Internet environment among 172 respondents from the city of Sofia, Bulgaria. The survey was conducted in the period October - December 2021. The main group of respondents are between 18 and 30 years old - 44.8 %, and between 31 and 40 years old - 30.2 %. By gender, 57 % are men and 43 % are women. In addition, an income question was asked to determine whether individuals are sufficiently solvent to use alternative public transport options, which are by default considered the cheapest option [2].

From the aforementioned survey, it became clear that a very small part (about 5 %) of the respondents use the so-called "green" alternatives for moving in an urban environment - electric cars and scooters for rent [2]. At the same time, however, a large number of them support replacing taxi services with electric cars (as seen in Fig. 1).

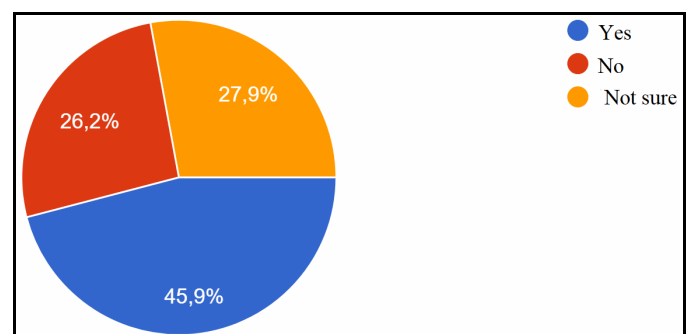


Fig. 1. Replacement of taxi services with green ones

The strong support for the change of taxi services with "green" ones, i.e. change of used cars with internal combustion engines of different types of fuels to electric cars, is supported by almost 46% of the respondents.

Those who are strongly against or cannot decide are almost evenly split at 26 % and 28 %, respectively.

Paradoxically, when asked whether they are willing to pay more for the use of similar services, the results are the opposite (see Fig. 2).

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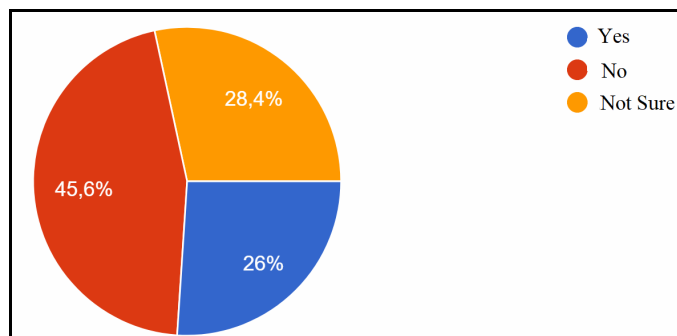


Fig. 2. Would you pay a higher price to use green services? (electric scooters, electric cars for rent or eco taxis)

It is clear from the figure that people are not willing to pay more to get a green service. Only 26% are willing to invest more money to use such a service. However, this is an unlikely scenario, because currently the price of liquid fuels is higher than that of electricity. It is difficult to determine whether this trend will be maintained in medium and/or long run, on the one hand the sanctions on the Russian Federation are expected to increase the prices of all energy carriers, but on the other hand it will force EU countries to invest significantly in renewable energy sources, and this should lead to a decline in energy prices in Europe in the long run.

In order to better clarify what the price elasticity of demand for these services is, a question with a percentage ratio of price increase has been added to the survey (see Fig. 3).

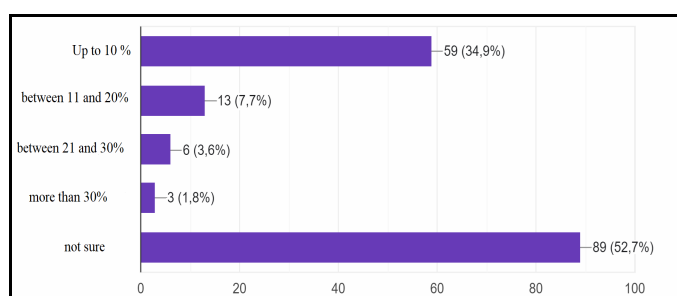


Fig. 4. Price elasticity of demand for green taxi services

From the figure, it is clear that a large part of the respondents is willing to pay up to 10% higher price of eco-taxis (about 35%) and about 53% are not sure. A significantly smaller proportion are willing to pay a higher value than 10% for a similar type of service. This is a major guideline for companies that wish to reorient themselves to the use of electric vehicles as a maximum cost rise.

The main conclusion is that the price elasticity is high and a price increase of more than 10% will result in a very large loss of potential consumers.

In general, it can be concluded that green alternatives for urban mobility in Sofia, Bulgaria are not very popular, and although users are willing to change one of the main options (taxi services), they are not inclined to pay extra for them if imposed. With a price increase of more than 30%, only 1.8% of users would continue to use alternative transport.

Although not very popular at the moment, green alternatives for urban mobility will continue to develop in the future, and therefore we will dedicate a part of this research to analyze future trends.

III. TRENDS FOR THE DEVELOPMENT OF URBAN MOBILITY AND TRANSPORT SERVICES IN THE CONDITIONS OF THE COVID-19 PANDEMIC

The development of artificial intelligence is expected to have a significant impact on the alternative transport in an urban environment in the future, as it can influence various aspects of movement in the cities, such as:

- ✓ Electric scooters and scooters as an alternative for urban courier and postal services;
- ✓ Self-driving cars;
- ✓ Courier services using drones;
- ✓ Use of artificial intelligence to optimize the transportation of people and goods, which leads to a significant reduction in transportation costs;
- ✓ Ecological logistics;
- ✓ Contactless deliveries and others.

These are just some of the modern trends in urban mobility and in the provision of transport services. According to some scientists [3], a number of these improvements are due to the COVID-19 pandemic, which has caused a serious rethinking of logistics processes.

Firstly, the use of electric scooters as a way of moving in an urban environment helps to have the social distance precisely because of COVID-19. Naturally, with the development of technology, it will become possible for electric scooters to carry heavier loads, which will lead to their use by urban couriers as an alternative to bicycles.

It should be noted here, that for the normal movement and use of electric scooters, it is necessary to take appropriate legislative steps. Work is already underway in this direction and a number of changes have been introduced, such as: age restrictions for usage, moving along the bike lanes or as far to the right as possible on the roadway, registration under certain conditions in the traffic police, speed limits and others [4, 5, 6]. In addition to the introduction of an appropriate legislative framework, it is also necessary to create an infrastructure that will facilitate movement in an urban environment with such vehicles. There is clearly still work to be done on this issue - according to data from the survey, to the question: "What initiative should the municipality take to support green transport?", a number of users answered precisely the improvement of the infrastructure, which is most often specified through building more charging stations and bike lanes. The finding of experts from the Institute of Road Safety [7] is similar - the lack of infrastructure for the movement of electric scooters makes it difficult for pedestrians to move. It is expected that this will be one of the main directions in the future work of all municipalities in Bulgaria, not only for the capital city.

Secondly, as a derivative of the wider application of green transport is ecological logistics, which refers to solutions for the transport, storage and the usage of packaging materials with minimal harm to the environment [3]. The initial steps in this direction are related to a reorientation from heavy-duty road transport to rail transport and the application of electric vehicles for smaller distances and loads.

Naturally, solutions for urban mobility will include replacing buses with electric ones and building charging stations suitable for charging them, expanding the use of the metro and additional incentives for the use of public transport. These decisions also find support in the survey as part of the answers to the aforementioned question, such as: "electric urban transport", "To reduce the price of metro tickets", "Increase of vehicles in urban transport, new metro lines, promotions when traveling by urban transport, more flexibility of urban transport, subsidizing green solutions in taxi services, with the aim of increasing the number of green taxis", "Easy and fast access to the metro, electric buses". The use of electric cars for the implementation of taxi services is a researched problem in Bulgaria and there is a compiled methodology for evaluating whether it is appropriate to replace fuel combustion cars with electric ones [8, 9].

Thirdly, contactless courier services are not new, but in the context of the COVID-19 pandemic, their spread is a necessity and has significant growth. They enable users to safely receive their shipments at an address without visiting a company office or meeting with an employee. In some cases, customers are even willing to pay more for this type of service. The logical development of contactless courier service is delivery by means of drones, which some companies are already implementing and which allows even more extreme deliveries at different heights, in the mountains and so on. One of the first companies to receive permission for drone deliveries was Wing in 2019, and the first attempts in this direction came from Amazon in 2013, which intends to use drones for around 50% of its deliveries by 2030 [10].

Fourthly, the implementation of artificial intelligence to manage a number of processes in the transportation of people and goods. The development of artificial intelligence has greatly facilitated people's lives, but it can be considered that the pandemic played the role of a catalyst for its faster introduction in a number of industries, including logistics - the imposed measures, curfews and others forced companies to replace human labor with IT alternatives or to look for an option for a "remote" work environment - from the employee's home. This is the so-called home office, for which there are already established rules [11].

Other key recommendations from the research survey are:

- ✓The municipality should invest funds for the purchase of eco cars/scooters;
- ✓Tax reduction or subsidy for the purchase of electric cars or other similar vehicles;
- ✓Reducing the price of public transport to stimulate its use;
- ✓Free electric scooters for temporary use;
- ✓Access to certain parts of the city for electric cars only.

These recommendations have their own logic and should be embedded in the overall policy of the country, not just for a specific municipality. It is unlikely that electric scooters will become completely free, but with good subsidization they can be much more affordable.

IV. CONCLUSION

In the past few years, a significant growth in the use of electric scooters and other forms of alternative urban mobility has been observed. This growth brings with it certain challenges and problems. Infrastructure and the regulatory regime for alternative vehicles in urban environments can be outlined as the main problems to be solved. Despite the above challenges, alternative urban mobility has its place in the cities.

On the one hand, the development of the so-called "green" forms of transport will also lead to changes in the implementation of courier/postal services - provided by electric cars, electric scooters and drones. On the other hand, the COVID-19 pandemic helped accelerate the introduction of high-tech processes in logistics, contactless customer service and more.

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