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MARKETING MANAGEMENT IN BLOOD SERVICE ENTERPRISES

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Abstract: *In blood service, the volume of collected blood components depends on availability of donors. High demands require high product quality (safety, etc.). Blood component quality depends on the state of donors health. Storage periods of blood components are limited and require certain conditions. Blood service enterprises should be located within the reach of patients, and mostly in big cities with a large population. The quality and quantity of collected blood are affected by the level of morbidity, which leads to the withdrawal of donors and losses to blood service enterprises. Consequently, the blood centre performance largely depends on success of marketing activities: number of donors and recruitment campaigns. Simultaneously, blood donation by volunteers is possible only thanks to successful and systematic advertising about the benefits of donation for health. Maintenance of a suitable health state depends on retention campaigns and establishment of long-term relations between blood centres and donors via direct marketing. Sales promotion measures force people to donate blood for the first time and make it a stable habit to visit a blood centre every month. The safest blood is from a regular donor, and retention marketing helps convert a primary donor into a regular one. The article carries out a bibliometric analysis of Web of Science works for 1991-2023 that are devoted to marketing at blood service enterprises. The analysis proved some facts. Firstly, the blood service topic requires studing further (there are only 304 works). Secondly, we see a growth of research interest (32.5% of all works for 2019-2023) and an almost double increase in annual citations from 2019. Thirdly, scientists from the United States, Germany, Australia, England, France, and Spain lead in such studies. The article summarises problems of the Ukrainian blood service. They can be solved with marketing management (safety, managerial, informational, economic). The paper defines goals and objectives, main stages and principles of marketing management for blood service enterprises. A system of 20 criteria for evaluating the efficiency of marketing management measures at blood service enterprises has been developed. The research results form a basis for the general idea of marketing management in blood service enterprises.*

Keywords: marketing management; blood service; marketing activities; management mechanism; donor; blood component; efficiency criteria; bibliometric analysis.

JEL Classification: I31, O13, P36

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INTRODUCTION

There are many aspects of blood service enterprises that are related to marketing:

- Number of donors, collected blood, and blood components (plasma, erythrocytes, platelets) depend on success of recruitment campaign;
- Blood donation by volunteers is possible only thanks to successful and systematic advertising campaigns about the benefits of donation for health;
- Maintenance of a health suitable state depends on retention campaigns and establishment of long-term relations between blood centres and donors via direct marketing;
- Sales promotion stimulates people to donate blood for the first time and make a stable habit of visiting the blood centre every month;
- The safest blood is from a regular donor, and retention marketing helps convert a primary donor into a regular one.

The marketing activity of blood service enterprises allows them to attract and retain a required number of people to the donor movement. Consequenlty, a necessary amount of blood and its components are collected from them.

Countries that actively use marketing achievements in blood centres fully satisfy needs of their region. According to the WHO (2022), in 60 countries, volunteer donors ensure 100% of blood supplies. They do this thanks to effective marketing programs.

In 2015, Great Britain conducted the Missing Type advertising campaign. To encourage new blood donors, hundreds of organisations have removed the letters “A”, “B” and “O” from their banners in social networks to draw attention to the “missing types” of blood donors. Campaign participants included famous international companies. The campaign attracted more than 30,000 new applications from potential donors in its first month. The campaign was so successful that many blood centres around the world joined the follow-up campaign in the following years (NHSBT, 2019).

Back in 2008, Cristiano Ronaldo became the face of an advertising campaign for donations. To this day, he cooperates with Associazione Volontari Italiani Sangue (AVIS). It promotes blood donation in Italy. During this time, a huge number of joint advertising campaigns were implemented (AllFootballApp, 2023). Such an activity also contributed to the fact that every Italian believes being a donor is a very honourable thing. In 2018, Ronaldo started supporting blood donation with the Singapore Red Cross (the Be The 1 movement).

For several years now, blood banks in Sweden have been sending donors a “thank you” message every time their blood rescues someone’s life. Donors are happy to share such messages on social networks, thanks to which the campaign has gone viral. Another well-known Swedish campaign is “Nag me until I become a blood donor”. In Sweden, everyone who is thinking about becoming a donor has an opportunity to leave their phone number. He receives a message every time the bank needs blood. Until now, on days when banks do not need blood, all subscribers of the program receive a message with the text “We will not give up until you bleed” (Upworthy, 2023).

In Ukraine, the number of donors and collected blood for 2012-2021 decreased by half, donations – by 1.5 times, plasma – by 15%. Besides, 70% of Ukrainian donors donated blood only once in their life. At the same time, the demand for blood and its components is constant. It grows every year. Requirements for blood safety and quality are rising worldwide. This trend hurts the quality and availability of medical care. Although in the first days of the Russian invasion more people were willing to donate blood than the blood centres could accept, after a few months there were announcements on the blood centre’s Internet platforms about the lack of blood and need for donors.

Locally, the Ukrainian blood service is represented by blood centres in each region. Their main tasks are to provide medical institutions with components and preparations of donor blood; to provide services for medical examination and registration of donors; to collect and process blood and its components; to test, store and transport blood and its components, etc. They can also produce blood plasma preparations; control the use of components and preparations of donor blood; organise the donation promotion among the broad strata in regions, etc. That is, they function as medium and small production enterprises with a sales market.

In many countries, blood centres deal only with examination, collection, processing, storage, transportation, neutralisation and distribution of donor blood and its components. Meanwhile, the Red Cross, donation associations, etc. procure donors and promote ideas of the blood donation volunteering.

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In Ukraine until the 1980s-1990s, there was a powerful centralised promotion of donation, which contributed to the blood service development. Over time, state support for the donor movement was canceled, free donation decreased, methods of donors' encouraging were lost. It led to a rapid reduction in both the number of donors and the volume of collected blood and its components. Currently in Ukraine, each blood centre promotes the blood donation idea on its own, without relying on significant support from the state. As a result, the Ukrainian blood service develops unevenly: in some regions this activity is unsystematic and not so large-scale. Thus, the number of donors ranged from 3711 to 31734 people per region. The total number of local donations was from 5590 to 106089. The number of donations per thousand population ranged from 4.83 to 102.64. As a result, there was a rapid decline in the industry (Perekhrestenko et al., 2023).

The Ukrainian blood service, which plays a strategic role in national security, is represented in 2021 by 29 blood centres (small and medium enterprises) and 204 blood banks (at hospitals). Only the Biopharma processing plant, and suppliers of equipment and consumables are representatives of big business in this field.

There are other approaches to the blood service organisation. In Italy, 21 regional blood centres coordinate the activity of respective local blood establishments network. Blood centres collect blood and its components, process, test, storage, and distribute them. Most establishments also work as blood banks in hospitals. Promotion of voluntary donations depends on public organisations, such as AVIS, FIDAS, FRATRES, CRI, etc. (EBA, 2024).

There are four blood services in the UK: England (NHSBT), Scotland (SNBTS), Wales (WBS) and Northern Ireland (NIBTS). They are subordinate to the UK Ministry of Healthcare. Each of the blood services conducts its national advertising campaigns to attract new and work with existing donors (EBA, 2024).

More than 50 blood centres operate in Japan while the system of blood collection and production of its components and drugs is managed by the Red Cross. The Red Cross, together with the government and regional authorities at the state level, organises a voluntary non-remunerated donation movement to guarantee a constant supply of blood products sufficient to provide medical care to patients. At the same time, regional governments are forming plans for blood collection. The Blood Donation Promotion Council is established in each prefecture under governors. Representatives of various organisations form groups of donors and recruit individuals. Blood centres cooperate with the Blood Donation Promotion Council in each region. They hold seminars and explanatory lectures on the blood donation promotion (EBA, 2024).

In Germany, the blood service functioning is provided by four organisations: the blood transfusion service of the German Red Cross; state and communal blood transfusion services; commercial blood centres; plasmapheresis centres of the plasma fractionation industry. In total, there are 70 blood centres in Germany (19 independent and 51 hospital-based). The German Red Cross has seven blood transfusion services, including 28 donor centres and institutes (EBA, 2024).

Peculiarities of blood service enterprises are that the volume of procured blood components depends on availability of donors. High demands are placed on product quality (safety, etc.). Blood quality depends on the donors' health state. Storage periods of blood components are limited and require certain conditions. The blood service facility should be located within the reach of patients (usually, in cities with a large population). Quality and quantity of collected blood are affected by the morbidity rate. It leads to the diversion of donors and losses to blood service enterprises.

The viability of blood service enterprises, like any other industry, mainly depends on management, including marketing management, which should be based on modern achievements of science. Marketing strategy is not the only functional strategy of the company. It plays a significant role in the long-term perspective (Savina, 2018). Additionally, the WHO and EU strategies for the blood quality and safety pay a considerable attention to the blood service marketing (WHO, 2022).

Since the provision of blood components is a priority country task, especially during the war, the issue of effective marketing management in blood service enterprises is relevant today. Therefore, there is a need to form a mechanism for marketing management in blood service enterprises.

There are many publications on the marketing management for small and medium enterprises. However, the theme of marketing management in blood service enterprises is not covered in publications.

LITERATURE REVIEW

Various aspects of activities of blood service enterprises are presented in works of scientists.

Aravindakshan et al. (2015) developed a marketing cost management model for blood banks. Because most blood banks in the United States are public non-profit organisations and have limited marketing budgets, they use three types of media: paid, owned, and earned (POE) media. The authors describe the rules for allocating advertising resources for blood banks and show when traditional recommendations for budget allocation do not apply. They found that in certain situations, earned media activity hurts the blood bank performance, even though it is mostly free.

Kauten et al. (2021) studied the use of modern machine learning algorithms for modeling donor retention. Acording to the data from a US blood centre, the authors built a donor retention model with a Matthews correlation coefficient of 0.851. This model of donor retention makes it possible to develop cost-effective programs for working with donors.

Zhu et al. (2023) developed a model to optimise donor incentive schemes by accounting for both the blood centre's stock level and random demand, perishable blood and blood components, the observation period between donations, and the variability of donor recruitment and dropouts. This leads to reduction in shortages and wastage. The model allows to determine the optimal number of donors. It takes into account that donors have different sensitivity to donations and require different encouragement.

Pereira et al. (2019) analysed how the Brazilian government programs of blood donation are perceived by different types of people: donors, non-donors, and potential donors. Most often, government campaigns are conducted not to change people's behaviour but rather as an emergency acting to cancel shortages in blood banks. Besides, there has been instability in the government's blood donation strategies, which contradicts the educational propositions present in social marketing theory.

Many scientists pay attention to establishing long-term relationships with regular donors. Thus, Sardi et al. (2017) investigated the elements of mobile gamification to retain donors, primarily among young people. However, most mobile blood donation applications are not multi-lingual and have social logins and traditional authentication methods. Most apps are multi-purpose: they help users find donors and blood centres, track the dates of future records to the centre, and check their ability to donate. Most installed apps include notification features. They also can notify users of nearby donation needs with built-in geolocation services. The most common elements of gamification are badges and points that can be exchanged. At the same time, there is a need for better incentives to attract potential donors to donate blood.

Martín-Santana et al. (2021) raises the question of increasing the satisfaction and loyalty of active donors. The strategy essence is to create comfortable conditions for donation that the donor is very satisfied with. This is done to support donors' intentions to donate blood again and to spread positive recommendations about donation among other people who could become donors in future. At the heart of this approach is the focus on donor and quality of services (primarily, safety).

Shehu et al. (2023) analysed strategies of improving relations with donors. He proposed a new strategy based on sending information about the use of previous donations. As a result, it increases donor's loyalty to the blood centre. It helps to keep donors, especially more experienced donors. It is also important that these messages are sent soon after the donation. Such appeals help to increase the rate of inactive donor retention.

Strategies for the transfer of blood donors into plasma donors to increase the frequency of donations were considered by Saltzmann (2023). This strategy is based on two mechanisms: awareness of need for plasma donation (donors are informed that patients need not only blood but also plasma) and perception of donors' response efficacy (understanding that donated plasma helps other people). Despite a weak desire to start donating plasma instead of blood, 31% of participants can join receiving additional information on this issue. A personalised appeal is effective. It contains information about the fact that the plasma of this particular donor can rescue someone's life. That is, to convert a blood donor into a plasma donor, he must first learn a need for plasma. Then, through additional interaction, face-to-face conversations, the donor realises that his plasma can rescue other people.

At the same time, it is a problem for many blood centres to attract a sufficient number of donors to the donor movement. For example, Gilbert et al. (2019) examined engagement campaigns through infection testing and effectiveness of print or video ads, news website ads, app ads, etc. To track the results, an access code unique to the media and linked to the account was used. The highest rate of account creation is seen among individuals who came through online advertising (although a much lower proportion of people went on to test). Advertising on physical sites was proven to be important and cost-effective because it had the lowest cost. This approach allows you to evaluate the effectiveness and economic efficiency of various advertising activities.

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Also, researchers focus on donors' behaviour. Thus, Wang et al. (2021) investigated the social information efficiency in changing the wishes of voluntary blood donation before and after the COVID-19 peak in China. Two messages were compared: thanking the donor and informing them about the patient's need for blood. It has been confirmed that in contrast to information about praise of blood donors, data about the demand of blood consumers has a stronger motivating effect on a person's intention to donate blood. The source of information must be official. Social information strongly effects on a person's intention to donate blood. The COVID-19 context does not show a significant impact on blood donation intentions.

Goette & Stutzer (2020) studied the influence of material rewards on donation. The authors found that, on average, a lottery ticket offer increased the likelihood of donating blood by 5.6 percentage points compared to a baseline of 46%. At the same time, this effect is manifested among less motivated donors. There is no decrease in donations over time.

Rodrigues et al. (2020) explored personality factors determining the donor's behaviour. The authors concluded the personality of non-donors is very different from potential donors. That is, potential donors may perceive blood donation and related barriers differently than non-donors.

The issue of improving the quality of blood components and their safety is also subject to detailed study. Nagurney & Dutta (2019) investigated competition in the US blood market and its impact on improving service quality. The developed model of the competitive network for blood donation determines the conditions of Nash equilibrium and provides the formulation of the variational inequality. It is established that the equilibrium model of blood service organisations is guaranteed to exist and provides conditions for the uniqueness of the solution. At the same time, the authors focus on the blood service quality, not on the quality of blood products. Competition between non-profit organisations also needs to be accounted for.

Martín-Santana et al. (2021) and Romero-Domínguez et al. (2022) studied the influence of socio-demographic and donor behaviour characteristics on motivation of donor behaviour as well as barriers to donation (Martín-Santana et al., 2020). People aged from 18 to 35 that have high education and high income are more frequently restrained by donation barriers. At the same time, people who have few donate experience (once or twice a year or less) are more exposed to donation obstacles. The biggest barriers are informational and time-space. Women prove to experience more internal barriers, and men are more restrained by external ones. Young people between the ages of 18 and 35 are most restrained by barriers but they decrease with age. For people with higher education and income, time barriers are most often. Donors with fewer donate experience have the least level of awareness and the most time and space constraints. On the contrary, those who donate blood the longest face the fewest barriers. The biggest barrier is among young people who study at university and rarely donate blood. However, they are of most interest to blood centres because of the nation aging. Therefore, blood centres need to focus their marketing campaigns on informational and procedural barriers. Also, blood centres need to analyse which donate barriers are the most common in their donor's base. They should determine the most important characteristics of these donors (in particular, socio-demographic). Based on these data, they can develop marketing campaign to decrease those barriers because of which people do not donate blood again.

Among the Ukrainian authors, there are several studies devoted to quality management in blood service enterprises. Such researchers are Liubchak et al. (2017) and Liubchak et al. (2021). The authors have developed a methodology for calculating the regional donor capacity. It allows the blood centre to determine the real number of potential donors that can be attracted through marketing campaigns. The developed methodology for calculating the cost of blood service allows them to account for both the blood centre's costs and those received through state programs. They also developed a mechanism for creating a blood centre by international standards based on the existing infrastructure. Moreover, the authors provided recommendations for creating an interregional plasma storage centre.

Perekhrestenko et al. (2023) conducted the blood service market analysis. It allows managers of regional blood centres to plan the collection volume of blood and its components.

METHODOLOGY, THEORY AND CONCEPTUAL FRAMEWORK

This study assesses the marketing management mechanisms in blood service enterprises.

The main focus of this study is a bibliometric analysis of literature sources about marketing management in blood service enterprises. Bibliometric analysis is based on quantity analysis of bibliographic documents. It allows to reveal trends and regularities within the researched issue.

Firstly, we provide sample forms based on the scientometric database by keywords. Such keywords for this study were "marketing management" and "blood donation". The selection was made by keywords in the

topic.

As a search result, 2,756 publications were found.

Next, the data is filtered by parameters (types of documents, language of documents, year, etc.).

Only research and review articles, proceeding papers were included in the sample. All works were published during 1991-2023. All of them are printed in English.

Thus, only 304 of the most relevant publications were included in the sample.

First, the dynamics of publications in terms of the number of works and the number of citations is studied. The increase in the number of publications and citations indicates the growing scientific interest in this topic.

Next, affiliations with the largest number of publications on the selected topic are determined. The absence of affiliations with a large number of publications indicates that there are no scientific schools on this topic. If there are affiliates with a large number of publications, they systematically study this issue.

The countries whose authors have published the most works on this topic are determined. This shows the authors of which countries make the greatest contribution to the development of this direction.

Authors who have the largest number of publications on the chosen topic are also defined. The study identified ten authors who published at least four papers. This may indicate the influence of these researchers in this field.

The paper detected five largest publishers in which the works were printed. Each has at least 12 works. Journals with the largest number of publications and how many citations these works have together are also determined.

Five most cited works on the topic have been identified. Their publication dates, number of citations, and average number of citations per year are compared.

Based on comparison of the number of publications and citations, it is possible to draw a conclusion about the influence of affiliation data, publishers, magazines, authors, and countries on the selected topic.

The next stage is to analyse keywords in the publications. This allows to study and identify clusters in publications on marketing management of blood service institutions.

Via the visualisation map of publications by level of semantic proximity and year of their activation, a conclusion is made about the periods in which the activation of studies took place and how their subject matter changed.

Next, a visualisation map with directions of research on marketing management in blood service enterprises in 1991-2023 is built.

After that, links among research keywords are built. The hierarchical cluster analysis is used to understand subdomains of research on marketing management in blood service enterprises. Cluster analysis of publication trends is carried out using the VOSviewer software (2024).

The visualisation map allows to see which directions of research prevail (the largest circle size means the most often research) and the connections between research topics. The map makes it possible to see research clusters. Next, keywords that are characteristic of each cluster are defined.

By comparing the visualisation map by regions and in general, you can see which clusters appeared earlier, which are the newest. Such an analysis makes it possible to see the main groups of research directions on the chosen topic.

In order to understand the topics of current research and predict the future, a similar map is being built based on data for the last five years – 2019-2023. It gives an opportunity to see what new directions of research are emerging and to predict the current topics of research for the coming years.

The work summarises problems of the Ukrainian blood service. It can be solved via marketing management. That defines the goals, tasks, main stages, and principles of marketing management in blood service enterprises.

A system of criteria for evaluating the performance of marketing management measures in blood service enterprises has been developed. Also, a sequence of stages is implemented for this.

A marketing management mechanism in blood service enterprises has been developed.

RESULTS

According to the Web of Science database 2,756 publications (articles, review articles, and proceeding papers) published during 1991-2023 in English are devoted to medical marketing. At the same time, only 304 publications are devoted to marketing management in blood service (Figure 1). The studied sample is based on the Web of Science data using the keywords “marketing management” AND “blood donation” OR “blood donor”.

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Among them, there are 243 articles, 46 review articles, and 23 proceeding papers. 32.5 % of all publications were printed during 2020-2023. It indicates the relevance of this topic.

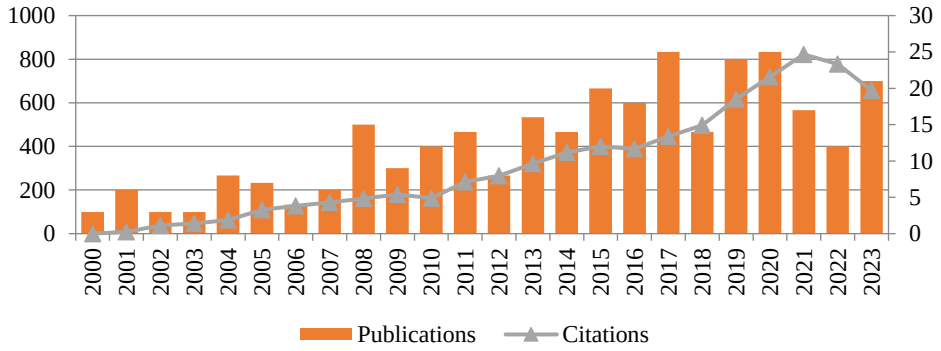

Figure 1. Times cited and publications over time

Source: Based on Web of Science (2024)

The increase in publications and citations of Figure 1 demonstrates a growing interest to the topic.

Most research is conducted in the areas of Hematology (78 publications), Business Economics (52 publications), Immunology (25 publications), Public Environmental Occupational Health (18 publications), Engineering (16 publications), Pharmacology (16 publications), Biotechnology and Applied Microbiology (14 publications).

Institutions with the largest number of publications by their affiliation are represented in Table 1.

Table 1. Affiliations with five and more publications on marketing management in blood service enterprises

Affiliations	Count	%
Universidad de Las Palmas de Gran Canaria	11	3.62
University of California System	11	3.62
University of Hamburg	10	3.29
Paul Ehrlich Institute	8	2.63
Harvard University	7	2.30
University of London	7	2.30
Monash University	6	1.97
Pennsylvania Commonwealth System of Higher Education (PCSHE)	6	1.97
University of California San Francisco	6	1.97
Deakin University	5	1.65

Source: Based on Web of Science (2024)

More than ten publications have affiliations with the University de Las Palmas de Gran Canaria (Spain), the University of California System (USA), and the University of Hamburg (Germany). It indicates that these institutions are investigating these issues on a permanent basis.

Researchers from around the world (Figure 2) studied issues of marketing management in blood service.

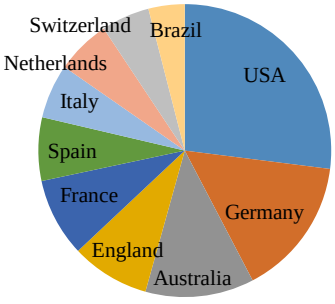

Figure 2. Countries with over ten publications on marketing management in blood service enterprises

Source: Based on Web of Science (2024)

Most works are published by authors from the United States (81 publications), Germany (46 publications), Australia (36 publications), England (26 publications), France (26 publications), Spain (21 publications), Italy (18 publications). This indicates the interest of these countries to this topic. At the same time, there is no publication by Ukrainian authors in this sample.

Over a thousand researchers are engaged in the study of marketing management in blood service. Authors with the largest number of publications are presented in Table 2.

Table 2. Authors with more than four publications on marketing management in blood service enterprises

Authors	Count	Citations
Martín-Santana J.D.	11	66
Beerli-Palacio A.	7	60
Garraud O.	6	93
Farrugia A.	6	32
Romero-Domínguez L.	5	29
Steiner P.	4	49
Leipnits S.	4	48
Clement M.	4	38
Heiden M., Hesse J., Seitz R.	4	19
Cabrera-Suárez M.K., Déniz-Déniz M.D.	4	4

Source: Based on Web of Science (2024)

Thus, Martín-Santana J.D., Beerli-Palacio A., and Garraud O. have the largest number of publications. Along with it, they are sufficiently cited authors on this topic.

Most of the works were published by the following publishers: Elsevier (78 publications), Wiley (52 publications), Springer Nature (32 publications), Sage (13 publications), and Taylor & Francis (12 publications).

Researchers publish their works in more than 200 journals.

Journals in which more than four works have been published are presented in Figure 3.

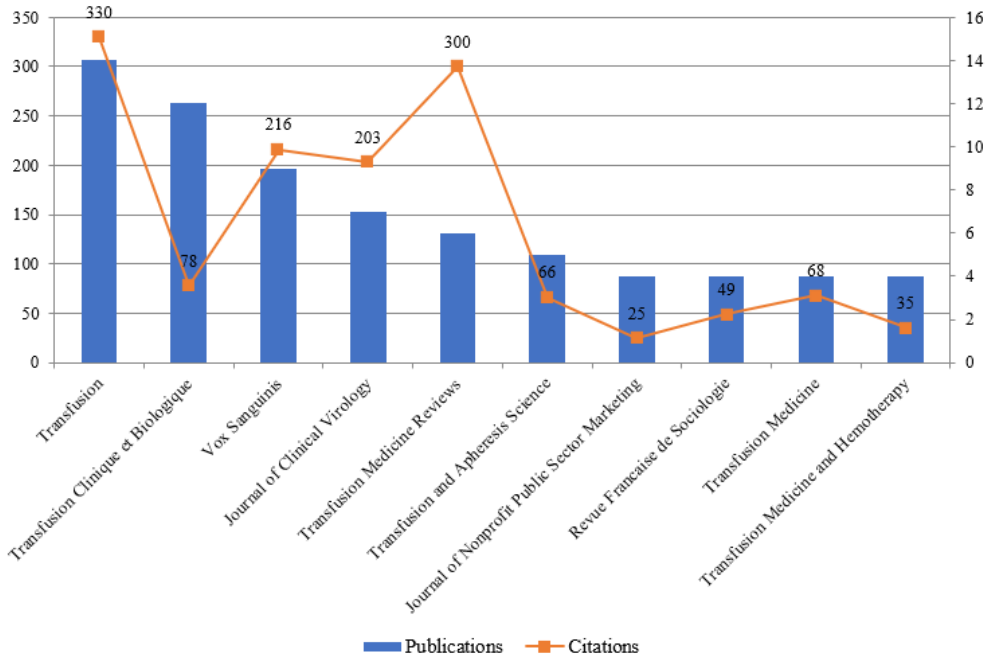

Figure 3. Journals with more than four publications on marketing management in blood service enterprises

Source: Based on Web of Science (2024)

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As can be seen from Figure 3, most publications were printed in journals *Transfusion* (14 publications), *Transfusion Clinique et Biologique* (12 publications), and *Vox Sanguinis* (9 publications). At the same time, the works published in *Transfusion* (330 citations), *Transfusion Medicine Reviews* (300 citations), *Vox Sanguinis* (216 citations), and *Journal of Clinical Virology* (203 citations) have the most citations.

The most cited works are presented in Table 3.

Table 3. The most cited publications on marketing management in blood service enterprises

Author	Publication title	Journal title	Year	Citations	Average citations per year
Wakefield M.A. et al.	Use of mass media campaigns to change health behaviour	Lancet	2010	1417	94.47
Bednall T.C. & Bove L.L.	Donating blood: A meta-analytic review of self-reported motivators and deterrents	Transfusion Medicine Review	2011	198	14.14
Slonim R. et al.	The market for blood	Journal of Economic Perspectives	2014	44	4.00
Shaz B.H. & Hillyer C.D.	Minority donation in the United States: Challenges and needs	Current Opinion in Hematology	2010	44	2.93
Shi L. et al.	Blood donor management in China	Transfusion Medicine and Hemotherapy	2014	40	3.64

Source: Based on Web of Science (2024)

The article "Use of mass media campaigns to change health behaviour" (Wakefield et al., 2010), published in *Lancet*, has the most citations (1417 citations). The authors describe the results of mass media campaigns in the context of risky behaviours (for example, use of tobacco, alcohol, drugs, etc.).

Another highly cited work is "Donating blood: A meta-analytic review of self-reported motivators and deterrents" (Bednall & Bove, 2011). It has 198 citations. This paper is devoted to the incentives and deterrents to blood donation, as well as to the estimation of the prevalence of each factor among the global population of donors and corresponding non-donors.

The researchers focus on marketing companies in the mass media, motivators, and demotivators (barriers), the blood market, work with donor groups, and donor management.

Keywords in the publications were analysed to study and identify clusters in publications on the marketing management of blood service institutions.

The topic of marketing management in blood service enterprises by year is shown in Figure 4.

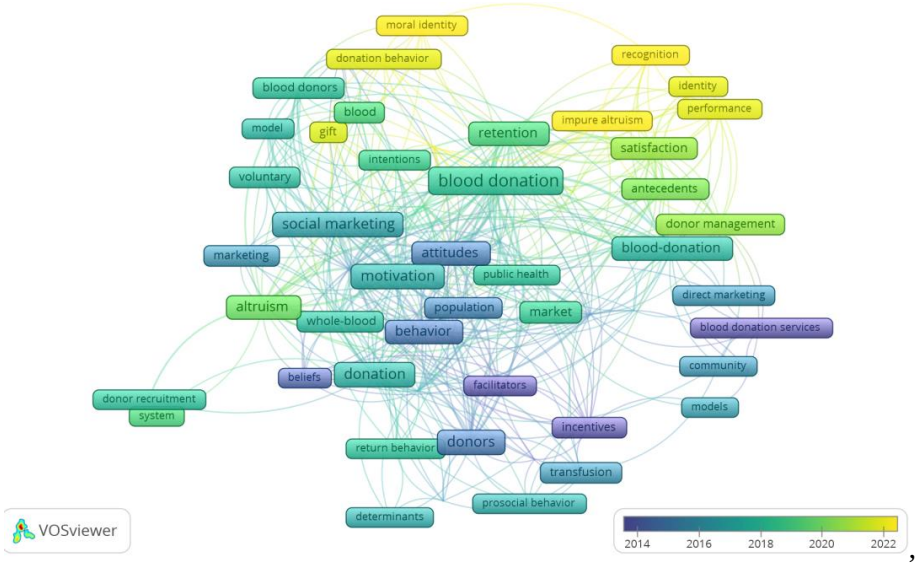

Figure 4. Visualised map of publications on the study of marketing management in blood service enterprises by level of semantic proximity and year of their activation

Source: Based on VOSviewer (2024) and Web of Science (2024)

As can be seen from Figure 4, research topics changed most intensively during 2014-2022.

So, in 2014-2016, most research was devoted to blood donation services, incentives, facilitators, and beliefs. In 2016-2018, research focused on return behaviour, determinants, prosocial behaviour, barriers, and disaster. In 2018-2020, attention was paid to altruism, donor management, satisfaction, antecedents, and retention. In 2020-2022, there were several studies on gift, impure altruism, performance, identity, recognition, moral identity, and donation behaviour.

The main clusters of research are represented in Figure 5.

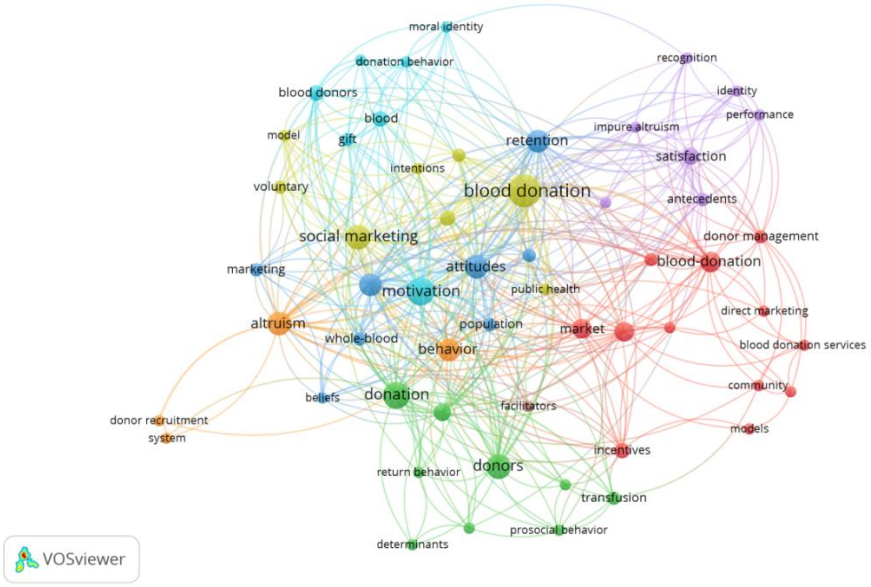

Figure 5. Directions of scientific research on marketing management in blood service enterprises in 1991-2023

Source: Based on VOSviewer (2024) and Web of Science (2024)

As can be seen from Figure 5, there are seven main research clusters. This map shows the frequency for use of terms (the circle size), closeness of the ties between them (the closer, the tighter), and different combinations of terms (both within clusters and between them).

As a result of the cluster analysis, seven complementary clusters were obtained that unite key concepts by thematic proximity (Table 4).

Table 4. Clusters and words obtained from keyword sharing analysis in Web of Science

Cluster	Keywords
Cluster 1. Donor management (red)	Donor management, blood donation, model, direct marketing, blood donation services, community, incentives, impact, market
Cluster 2. Donor characteristic (green)	Donation, donor, transfusion, return behaviour, patterns, determinants, prosocial behaviour, barrier, disaster
Cluster 3. Retention (blue)	Marketing, retention, whole-blood, knowledge, population, recruitment, attitudes, beliefs
Cluster 4. Social marketing (yellow)	Model, voluntary, social marketing, donation intention, planned behaviour
Cluster 5. Impure motives (violet)	Recognition, identity, impure altruism, satisfaction, antecedents, non-profit organisation, performance
Cluster 6. Motivation (sky-blue)	Moral identity, donation behaviour, motivation, gift, blood, selection
Cluster 7. Donor recruitment (orange)	Donor recruitment, system, altruism, behaviour

Source: Based on VOSviewer (2024) and Web of Science (2024)

As can be seen from Table 4, only one cluster is devoted to management, most to behavioural aspects and work strategies (retention, recruitment, social marketing).

Studies of the last five years reflect modern trends. They are presented in Figure 6.

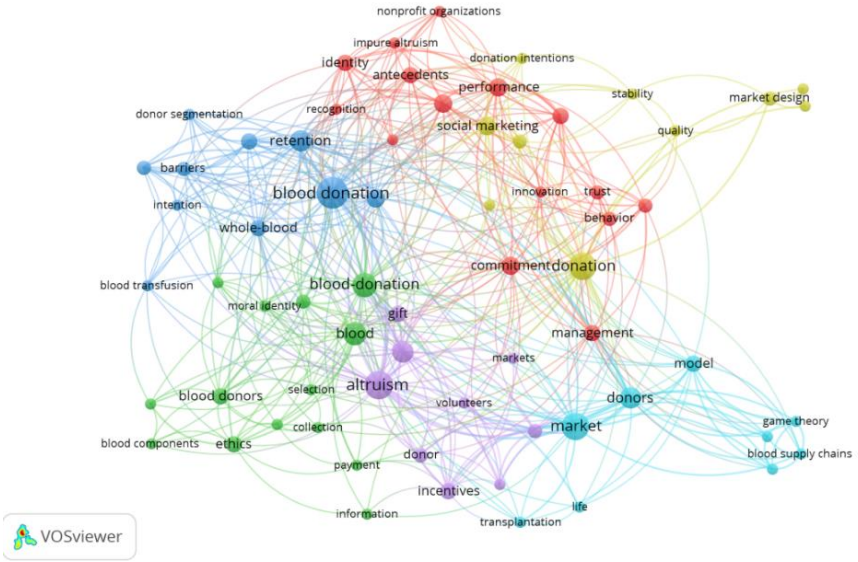

Figure 6. Directions of modern scientific research on marketing management in blood service enterprises for 2019-2023

Source: Based on VOSviewer (2024) and Web of Science (2024)

Most studies are devoted to altruism, donors, motivators, retention, satisfaction, social marketing, and performance. Some studies also consider game theory, payment, ethnic aspects, innovations, and stability.

Thus, publications cover various aspects of blood service activities. Meanwhile, the marketing management mechanisms in blood service enterprises remain insufficiently studied.

Each blood centre has functions such as a production enterprise, development, and further existence. Blood centres themselves make decisions on development of marketing activities, loyalty of donors, and organisation brand. They face problems typical for enterprises of other industries.

Therefore, to develop marketing management mechanisms in blood service enterprises, it is advisable to consider the essence and main components of the mechanism and adapt it to the blood service specifics.

Among modern specialists, there is no unequivocal position for marketing management essence. There are several approaches to defining the concept of marketing management (Figure 7).

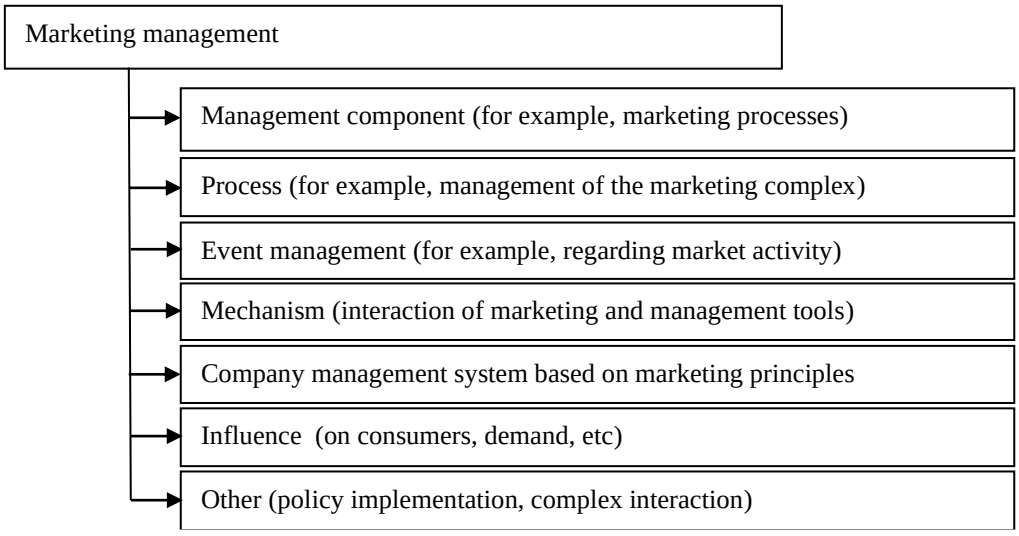

Figure 7. Interpretation of concepts regarding the marketing management

Source: Based on Dudar (2022); Kovshova (2018); Buniak (2019); Borysenko et al. (2022); Kosenko (2023); Karpenko et al. (2016); Kotler & Keller (2016)

Most scientists interpret the concept of marketing management as a component of enterprise management. In particular, that concerns establishing, strengthening, and maintaining mutually beneficial exchanges with the target market; management of enterprise functions; all spheres of enterprise management; elements of marketing activities and marketing processes (Kotler & Keller, 2016, Balabanova et al., 2012; Dudar, 2022).

Another group of researchers defines marketing management as a process related to management functions. In particular, that deals with the process of planning and implementing marketing concepts and organising activities at the enterprise to achieve the goal. Some scholars consider it as a process of marketing management, as a service or a marketing complex. At the same time, some focus on achieving company goals, others on identifying target markets, meeting the needs and desires of people and the organisation, and establishing and maintaining mutually beneficial relationships (Kovshova, 2018; Lambin, 2012, Buniak, 2019).

A group of scientists considers marketing management as the management of measures to establish and maintain profitable exchanges with target buyers for success among consumers (Huzenko, 2017; Ivashchenko, 2011; Borysenko et al., 2022).

Also, marketing management is regarded as a mechanism of the management process, as a system and component of the overall enterprise management system, as an influence on other participants and processes, as a result of enterprise activities, and as the enterprise policy implementation on the market.

Thus, marketing management is treated as:

- Part of the general enterprise management;
- Management of marketing components (4P, marketing staff);
- Activities related to influencing the market, consumers and demand; finding opportunities to influence market changes; studying consumer needs;
- Management functions (planning, motivation, organisation, and control); measures to establish and maintain mutually beneficial relations with consumers;
- The enterprise policy implementation according to marketing principles.

Marketing management in blood service enterprises will be considered as a mechanism of interaction of marketing and management tools.

Problems, goals, tasks, subjects, objects, stages of management, principles, resources, criteria, evaluation, and management decision-making are important for marketing management.

At the heart of any management are problems. All problems of the Ukrainian blood service solved via marketing management can be divided into safety, managerial, informational, and economic (Khomenko et al., 2022).

Safety problems:

- Providing the medical industry with components and preparations of donor blood with adequate safety;
- Eliminating lack of a sufficient base of regular donors whose blood is the safest;
- Using the polymerase chain reaction method (PCR) to detect that hemotransmissible infections do not occur in institutions of the Ukrainian blood service;
- Preventing sensitivity, allergy or any pathological conditions in patients who receive frequent blood transfusions;
- Decreasing population morbidity with pathogens of hemotransmissible infections (31% of donors were excluded from donating in 2020 precisely for these reasons);
- Controlling key stages of donor selection and testing of collected blood;
- Avoiding hemotransmissible infections among donors.

Managerial problems:

- Creating a sufficient base of personnel donors;
- Promoting volunteer blood donations;
- Providing the medical industry with sufficient donor blood products;
- Storing blood components as long as possible;

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- Recruiting new blood service staff.

Informational problems:

- Finding new regular donors (only 7-15% of people donate blood regularly);
- Raising number of donors (in 2012-2021, their number halved);
- Developing volunteer donation on the state level (in many European countries, the Red Cross helps to solve this problem properly; in Ukraine, there are blood associations but they help in promoting donations only locally);
- Overcoming donation barriers (lack of time, postponement of the blood donation, inconvenient work schedule of the blood centre, hard accessibility to the blood centre, change of residence, fear of needles and pain, medical contraindications, lack of knowledge, fear of getting infected, fear of lowering hemoglobin).

Economic problems:

- Financing of marketing activities;
- Increasing donations (currently, there are less than 12 donations per thousand people in Ukraine, with 33 donations recommended by WHO; on the contrary, more than 40 people donate in Denmark, France, Finland, Italy, and Germany);
- Providing the medical industry with sufficient donor blood products (WHO recommends 12-15 ml of donor blood per 1 resident; for Ukraine, it was 5.7 ml in 2021);
- Getting accustomed to the market competition.

The purpose of marketing activity management can be:

- Meeting needs and obtaining planned results (Kosenko, 2023; Dudar, 2022; Borysenko et al., 2022);
- Achieving a commercial result and social effect (Kovshova, 2018);
- Optimising productivity (Ivashchenko, 2011);
- Ensuring a high level of management quality (Buniak, 2019);
- Providing a complete offer (complex product) that includes both the main product or service and "additional elements" with it (Kotler & Keller, 2016).

For blood service enterprises, the goals of marketing management are:

- Optimising personnel in the blood centre;
- Optimising the raw material base (donors);
- Ensuring needs of local medical institutions in blood components;
- Optimising the blood service enterprise efficiency within a competitive market.

All or almost all business processes of the blood service institution are taken into account. The staff goals and raw material base optimisation cover only some business processes of the blood service enterprise. So, their use will have a limited effect.

Achieving the company's goals is ensured through the performance of marketing management tasks. They cover a large number of aspects of the organisation and management of marketing activities.

Since the institution needs to research donors, there are also other blood facilities, healthcare institutions, plasma centres, partners for cooperation, services, etc.

The blood service is a healthcare enterprise. It requires management of production, sales activities, and marketing mix. It is necessary to develop strategies and tactics for stakeholders (attracting, retaining, and returning donors; working with staff to promote donation; promoting a healthy lifestyle and free donations, etc.). The blood institution creates a marketing information system regarding donors. It satisfies needs of other medical institutions, processing plants, warehouse blood stocks, etc. Although in most regions there is only one blood centre. Consequently, we must set goals to create a distribution network of blood service institutions. The task of forming the mission and goals, positioning of the enterprise may also be relevant. As for the marketing management and sales personnel, the marketing personnel is usually represented by a maximum of one person in the blood centre. There is no sales personnel. However, there is a need to manage staff who work directly with donors, answer phone calls, develop advertising products, interact with the media, partners, etc. Besides, we should organise marketing events (promotions with enterprises, events for VIP donors, presentations of awards, donor days). For implementation of any marketing activities, it is

necessary to develop marketing programs, control, and analyse the activity effectiveness (number of new donors, regular donors, donations; information on shortages; activity on Internet resources; advertising coverage, etc.).

The following tasks can be identified for blood service enterprises:

- Achieving a 100% staffing of blood service specialists;
- Minimising the share of diversions from donations;
- Maximising the number and share of donors from the total population in the region;
- Maximising the number of donations, prepared components and blood donations from one person;
- Increasing the advertising performance;
- Maximising the number and share of regular donors;
- Ensuring the annual increase of donors;
- Minimising the number of reactions during the transfusion of blood components;
- Increasing the share of apheresis platelets to 100%;
- Minimising the proportion of deficiencies in blood components;
- Optimising promotion costs;
- Minimising the purchase price of blood components for blood banks;
- Maximising the share of sales of components to external customers;
- Reducing the share of energy costs in the cost structure;
- Reducing the share of blood component write-offs.

Management subjects can be the head of the institution, a group of persons, or units that manage business processes.

Management subjects in marketing activities of blood service enterprises are the founder, director, and chief physician.

Management objects are a part of the socio-economic system that is influenced and managed.

Management object in marketing activities of blood service enterprises is the marketing complex (product, price, promotion, sales, people, process, physical environment).

The process of marketing management in most enterprises includes the following stages:

- Analysing the state of marketing activity, company capabilities, and marketing environment;
- Establishing and correcting the enterprise goals in general and marketing in particular; determining expected results;
- Selecting target markets, planning and developing some marketing programs, planning new goods and services, etc.;
- Developing strategy and tactics: a marketing complex, solutions, market positioning;
- Implementing (organising): measures, responsible persons, terms, provision with necessary information and resources;
- Managing: staff motivation, marketing processes, incentives, production of goods.
- Controlling over execution of marketing activity, work, plan, and synthesis.

Sequence of the marketing management stages is determined by management functions (analysis, planning, motivation, organisation, implementation, and control). At the same time, management is considered in the context of production and sales activities on the market (stock, price, communication, distribution), marketing services (management of marketing and sales departments), and company personnel (internal marketing).

These stages are also typical for blood service enterprises. However, they have own features. The enterprise must analyse the regional donor capacity, the number of active and lost donors, the amount of collected and defective plasma, the amount of shipped and preserved plasma, the activity of competitors, etc. It is necessary to plan required donations, shipped components, advertising coverage, new partners and donors. At the stage of the blood service enterprise implementation, in addition to marketing activities, it is necessary to conduct video and photo records of blood donations, receive feedback, and involve donors in creating client content.

The following stages of management can be distinguished for blood service enterprises:

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- Analysis (problems, market, and marketing opportunities);
- Assessment (the current state of marketing activity management);
- Planning (setting goals, segmenting donors, developing a marketing program);
- Procuring and processing (completing the marketing program to obtain blood components, control and assess compliance with the planned indicators);
- Applying (completing the marketing program to sell blood components, control and assess compliance with the planned indicators);
- Implementing and controlling (check how marketing programs meet the planned goals).

Most of the stages are common to all enterprises. However, some are specific only for the blood service enterprises: procuring, processing, applying.

During marketing management, subjects can follow several principles.

The following principles can be identified for blood service enterprises:

- Efficiency;
- Optimality;
- Performance;
- Research;
- Correct selection and rational placement of personnel;
- Competence;
- Complexity;
- Purposefulness;
- Timeliness;
- Adequate response to market needs;
- Flexibility.

To manage marketing activities, you must have resources: financial, material, technical, and staff. The same is typical for blood service enterprises.

There should be criteria for analysing the success of implemented measures. Based on the tasks of blood service enterprises, the criteria are:

x_1 – the share of referrals from donation is minimal;
x_2 – the number of reactions per thousand orders is 0;
x_3 – the share of apheresis platelets in the total number of harvested platelets is 100%;
x_4 – the proportion of lack of preserved donor blood from the collected blood is minimal;
x_5 – the share of erythrocyte mass deficiency related to safety is minimal;
x_6 – share of regular donors is 60-70%;
x_7 – increase of regular donors is maximal, more than 10%;
x_8 – share of donors from the total population is maximal, more than 3%;
x_9 – increase of new donors is maximal, more than 10%;
x_{10} – the share of blood component write-offs (erythrocyte mass) is 0;
x_{11} – staffing level is 100%;
x_{12} – the base of permanent (active) donors in the region during the year is maximal;
x_{13} – number of donations per 1,000 population is maximal, more than 33;
x_{14} – the number of blood components prepared per 1 inhabitant (in ml) is maximal, more than 12-15 ml;
x_{15} – the average number of blood donations from 1 person per year is maximal, no more than 4-6 blood donations / year, 12-18 plasma donations / year;
x_{16} – the average price of marketing costs for 1 donation is optimal when achieving target indicators regarding the number of donors and donations;
x_{17} – the advertising efficiency coefficient is maximal;
x_{18} – the price of purchasing plasma for the blood bank is minimal;
x_{19} – the price of purchasing erythrocytes for the blood bank is minimal;
x_{20} – the share of sales to external customers in the sales structure is maximal.

To analyse the current state of marketing management in blood service enterprises, it is necessary to conduct an assessment in the following sequence:

- Formation of an information base;
- Calculation of unit indicators;
- Normalisation of indicators;
- Determination of indicator weight;
- Calculation of group indicators;
- Gradation of efficiency.

Management decisions are made taking into account the current state of marketing management, and management stages.

Considering the general stages of management and specifics in the blood service, the next marketing management mechanism for blood service enterprises can be proposed (Figure 8).

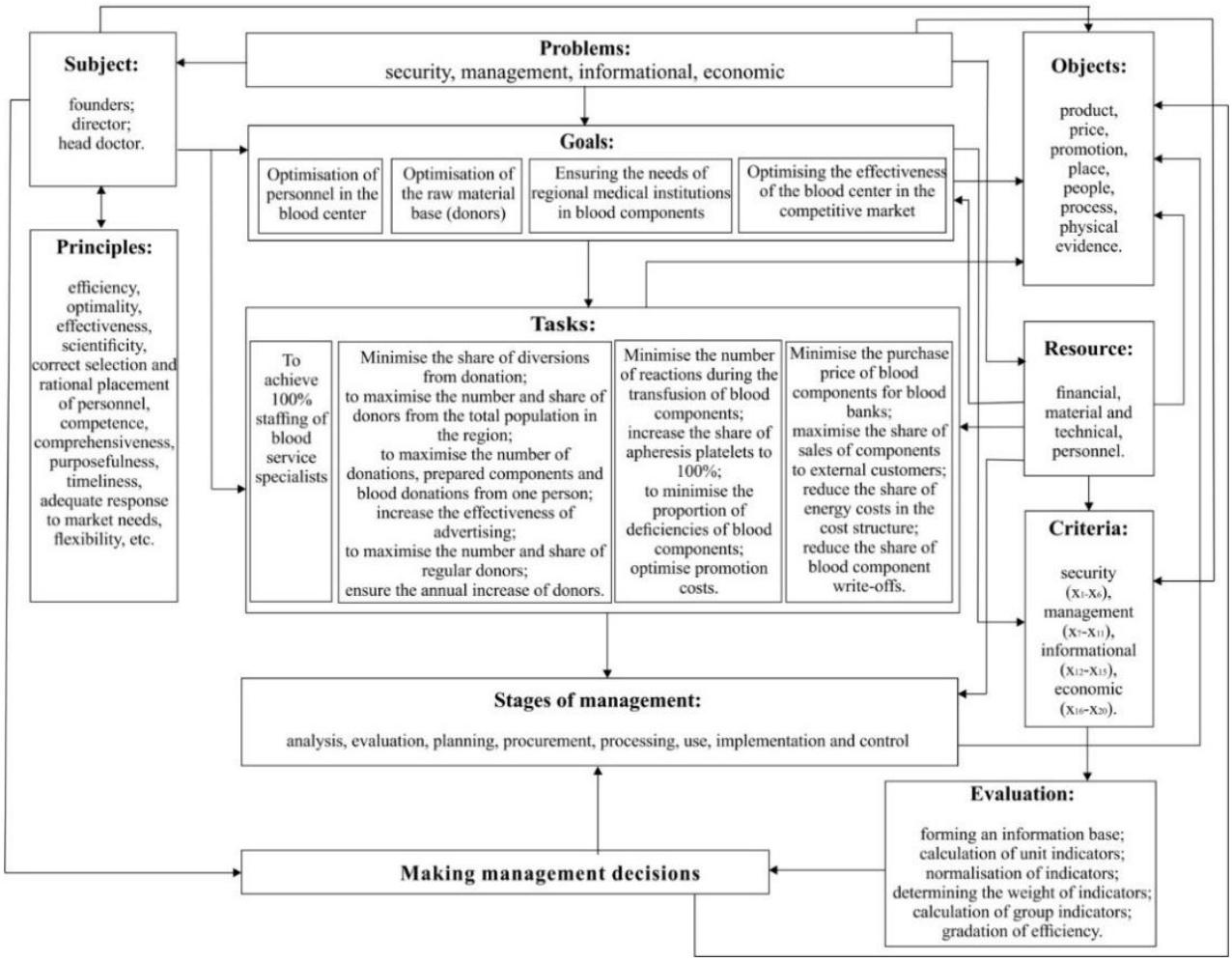

Figure 8. Marketing management mechanism in blood service enterprises

Source: Generated by the author

A straight arrow indicates the direction of influence, and a two-sided arrow – a two-way influence.

Management decisions are made by subjects regarding the object. Based on the problems, goals, tasks, and stages of management, subjects evaluate the object and available resources; conduct evaluation based on criteria, guided by management principles; influence the management process and the goals to be achieved.

Therefore, the process of marketing management in blood service enterprises is based on the following components: problems, goals, tasks, stages of management, subjects, objects, principles, resources, criteria, evaluation, and management decision-making.

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CONCLUSIONS

Currently, there is a large amount of research on the marketing aspects of blood service activities. Simultaneously, the marketing management mechanism in blood service enterprises remains insufficiently researched.

Based on data systematisation for marketing management of various industries, a marketing management mechanism in blood service enterprises was formed.

Entry points are issues related to donors, medical facilities, or ongoing business operations.

All problems of blood service enterprises are related to safety, management, information, and economics.

It is necessary to optimise the raw material base (donors) to solve informational, managerial, economic, and safety problems. To do this, the donor contingent should be optimised at the expense of regular donors. The efficiency of its use should be increased (donate blood more times a year). Also, it is necessary to promote voluntary donation, and establish long-term cooperation with donors (for example, via loyalty programs).

Some managerial and economic problems are related to interaction with medical institutions. To eliminate them, we must ensure the needs of local medical institutions in blood components. To do this, it is necessary to analyse the demand for components from medical institutions. You should find additional ways of selling blood components (for example, to other regions), services (to population and other medical institutions). Besides, you must investigate competition or monopolisation, find new niches in the market (for example, cosmetologists). You need to interact with customers, provide and transfer values, create conditions for a successful long-term growth.

Some safety and economic problems require optimising performance of the blood service enterprise within a competitive market. To achieve this goal, it is necessary to regularly monitor market entities, manage production and sales activities. We should develop strategies, tactics, and marketing plans. We have to manage sales and marketing personnel, create a unified marketing information system. Also, we need to form a mission, goals, positioning, values, and strong brand. Finally, marketing activities should be organised.

Some management problems require optimisation of personnel in the blood centre.

Issues are also influenced by market actors through relevant decision-making. The subjects are the enterprise director, founders, and the chief physician.

Goals and objectives affect marketing objects and are approved by subjects. Objects include a complex of marketing based on the 7Rs: product, price, promotion, sales, people, process, and physical environment.

Based on goals, tasks, and stages of management (analysing, assessing, planning, procuring, processing, applying, implementing, and controlling), subjects are selected tool to solve tasks according to the marketing mix components. At the same time, the selection of tools is carried out taking into account the principles of management. They make it possible to carry out an analysis and form plans for procurement, processing, and use, to assess compliance with the planned indicators.

Management tasks are carried out considering resources (financial, material and technical, personnel).

As a result of the management of entities, an analysis of the current state of marketing management is carried out via criteria.

Based on the obtained values, the subjects make management decisions regarding the components of the marketing complex.

If the planned goals are achieved, there is a transition to new objects or goals.

Thus, the developed mechanism takes into account the specifics of the marketing management in blood service enterprises. The results of the conducted research can be useful for further scientific activity on this topic. They can be taken into account in the work of blood service enterprises.

Author Contributions

Conceptualisation, L.K.; methodology L.K.; software, Y.R.; validation, Y.R.; formal analysis, L.K..; investigation, L.K.; resources, L.K.; data curation, Y.R.; writing-original draft preparation, L.K.; writing-review and editing, Y.R.; visualisation, L.K.; supervision, L.K.; project administration, L.K.; funding acquisition, L.K.

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