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The Functional Model of Medium of Popular Science Content

Abstract. The conceptual model of medium of popular science content was implemented with consideration of its functional features. The algorithm of development, the architectonics peculiarities, the representation forms of designed model involve to take into account the requirements for the functioning of a modern competitive information product.

The purpose of creating the conceptual model of medium of popular science content is implementation of the concept of mass media, which will ensure compliance with such system of interconnected requirements: presentation of scientific content in popular form; segmentation of the purpose-oriented audience; achievement of commercial success of the project; availability of an evolutionary perspective.

During the research, the following methods of scientific knowledge were used: comparative-historical, analytical methods of classification and grouping, methods of modeling, foresight and SWOT-analysis, descriptive method. The comparative-historical method was used to analyze and systematize data on the formation and development of popular science content; classification and grouping – to specify the thematic and typological features of popular science content; the method of comparison – to identify the common and distinctive features of different models of medium of popular science content; descriptive method – for presenting and substantiating the research results. The basis of the concept of modeling the medium of popular science content is the opinion that the successful functioning and competitiveness of the content medium is the result of strategic design as a mechanism of social management. The use of foresight methodology in development of the conceptual model of medium of popular science content gave the opportunity to take full account of the features of its stylistic and typological characteristics, based on the potential of integration of journalistic skills, innovative marketing and information technology.

The creativity has highest potential because of ability to strengthen all the basic principles: both during the formation (modification) of the creative concept, and during the formation and development of informative and artistic content, and during the implementation of convergence processes. This testifies that a creative approach is a necessary component of success in all areas of the functioning of medium of popular science content, because it is

directed to design original, innovative forms and methods of journalistic art, which in its integrated summary is capable to generate a qualitatively new mass-media product.

Key words: popular science content, information resource, mass media, model, concept, social communication, strategic planning

I. Introduction

Modeling of social and communication processes and phenomena to which the mass media system belongs, is a significant component of social management and it is considered as a purposeful process. It combines the creative, intellectual and motivational components of participants' communication interaction. The purpose of creating the conceptual model of medium of popular science content is implementation of the concept of mass media, which will ensure compliance with system of interconnected requirements: presentation of scientific content in popular form; segmentation of the purpose-oriented audience; achievement of commercial success of the project; modification possibility.

The issue of modeling information resources of certain types is poorly presented in scientific publications. Mainly certain aspects of the research methodology are considered. They require systematization and generalization to be developed into a model.

Important aspects of the study of mass media typological characteristics, dissemination forms of information are investigations of effectiveness of media impact on public consciousness. V. Rizun studies the impact of the media in the social communication system [Rizun 2008, Rizun 2014 p. 8 – 9]. Yu. Lavrysh analyzes research methodology of new local media social communication based on the model "Church-new media-society" [Lavrysh 2014, p. 45–46.]. H. Horbenko studies methods of evaluation and ways to increase the effectiveness of social advertising. She points out that in the theory and practice of advertising wasn't formed a single view on its effectiveness and there is a lack of objective and comprehensive assessments of the effectiveness of social advertising. The scientist explains this state of things by the lack of a scientific and methodological approach to the assessment of the social advertising effectiveness [Horbenko 2014, p. 27–29]. T. Bondarenko investigates the state of scientific popularization in the local media space, examines presentation specifics of popular science texts in print and electronic mass media, reveals the negative and positive aspects of this topic and also suggests ways to increase its popularity in the media [Bondarenko 2012]. N. Zelins'ka in the brilliant style, perhaps inherent to a few recent scholars of publishing, protects the genre of scientific journalism, which is based on the principle of popularization [Zelins'ka 1995]. The scientist studies in detail the typological and

content characteristics of Ukrainian scientific periodicals [Zelins'ka 1999, Zelins'ka 2001]. D. Filonenko studies popular science information resources, draws attention to the traditions and innovations which are typical for theoretical and practical factors of mediums of popular science content. The scientist investigates not only problem and thematic but also specific regularities of information presentation in various types of popular science mass media. He emphasizes the problem of terminological barriers as a factor of creating the popular science publications [Filonenko 2015]. O. Husak explores the problem of processing scientific popular content. She notes that professional adaptation of texts to the required level of the audience leads to the most correct understanding of the content. The scientist believes that such a professional adaptor should be an editor. O. Husak analyzes the work of the editor on the materials of the Internet communication media [Husak 2015].

The next group of studies is devoted to the various aspects of the media content creation and its study, which provide methodological basis for modeling the process of scientific knowledge popularization. N. Zrazhevs'ka investigates the use of the semiotic method in the analysis of media culture [Zrazhevs'ka 2013]. A. Kondryko analyzes the main features of the narratives functioning in the Internet media content. The scientist formulated and tested the typology of personal narratives and generalized samples of using personal narratives in electronic discourse [Kondryko 2013]. T. Koval'ova considers the place and function of details in travel essays published in the magazine [Koval'ova 2012]. N. Vyhovs'ka studies preconditions for the appearance of convergent mass media in the realities of the modern society development. She explores current context of information space development and evolutionary changes associated with the implementation of information and communication technologies [Vyhovs'ka 2015]. Yu. Buzhyns'ka considers formation of the main methodological approaches to the creation of a typological characteristics of journal business publications, expands the horizons of modeling modern mass media system [Buzhyns'ka 2011].

The researches of models of popular science information resources certain types are presented in the following scientific works. Yu. Zelenyuk studies parameters of media segment such as journals-travelogue. The scientist notes that travelogue journals are a promising direction in modern journalism. He examines types and models of such publications on the basis of publishing strategies of leading media holdings [Zelenyuk 2012]. R. Verbovyi, by studying the development trends, specifics of the electronic youth editions' topics, proposed a formal and descriptive compositional graphic model of the youth magazine. During the modeling was implemented:

- elements of compositional and graphic content of the youth magazine were defined;
- methodology of organizing journal space by developing a system for placing design elements was developed;
- features and regularities of the positioning strategy of the youth magazine, realized through the visual representation of the publication conceptual essence, were formulated;
- the principles of practical use of compositional and graphic model of the youth magazine were established [Verbovy 2013].

Profound comprehension of the theoretical principles of modeling is presented in the works of D. Lande, V. Furashev, K. Yudkova, who formed the system of theoretical knowledge on the methodology and method of professional activity in informational and socio-legal modeling, forecasting, designing [Lande, Furashev, Yudkova 2014].

However, problems of argumentation and development of conceptual model of medium of popular science content which implements its functional features remain practically undeveloped in social communication. This emphasizes the topicality of this study.

Methodology. During the research, the following methods of scientific knowledge were used: comparative-historical, analytical methods of classification and grouping, methods of modeling, foresight and SWOT-analysis, descriptive method. The comparative-historical method was used to analyze and systematize data on the formation and development of popular science content; classification and grouping – to specify the thematic and typological features of popular science content; the method of comparison – to identify the common and distinctive features of different models of medium of popular science content; descriptive method – for presenting and substantiating the research results.

The method of modeling relies on the use of tools of the foresight socio-economic method, which enables to implement a perspective scenario forecasting the development of medium of popular science content, because it reveals opportunities to achieve the greatest social-communication and economic benefits [*What is foresight...*]. The SWOT analysis method is part of the foresight toolkit and is used to form the analytical base of modeling [Konovalova 2010].

The hypothesis of research. The medium of the popular science content consider as a complex system, since it is a multicomponent object in its purpose-oriental and auditorial typological features which organically combines the functions of the scientific, educational, popular information source and, as far as possible, among all other kinds and types of content mediums best represents the processes of convergence. The mediums of the popular science content are actively functioning in the information space, which can be represented as

a communication environment – a complex system with a composition of connections between information sources and converters interacting with each other, depending on the level of perception of the generated and converted individual informational messages [Lande, Furashev, Yudkova 2014, p. 66]. Among the numerous features of a complex system the most topical for modeling the medium of popular science content are the openness of the system and the ability to self-organization [Sharkovskiy 1989]. Therefore, the construction of a conceptual model of medium of popular science content involves identifying and nominating all essential components of the system, setting limits of their values, identifying the most significant factors, dependencies, peculiarities and regularities.

The investigation of the model involves the study of the system functionality, within which the existence of close interconnections between its subsystems manifests in the change of its output characteristics under the influence of input ones.

II. Results

The developed conceptual model has two variants of representation: table and graphic.

Table conceptual model. Using the matrix, generated during the SWOT analysis [Petrushka 2017], by the abstraction was generated a system of strategic principles (strategic management, reader centricity, functionality, meaningfulness, aesthetics, convergence, creativity, sensationalism, content balance, quasi-presence, interactivity, author's quota, authenticity, controversy, promotion) which underlies the construction of a conceptual model of medium of popular science content, since they reflect the essential features of the policy for its creation, functioning and development. Using stratification method the system objects (generated strategic principles) were set by levels: basic and variable.

For hierarchy of stratified basic and variable principles we used a differentiated approach. The hierarchy of the basic level principles is founded on the sequence of stages of the formation of the medium of popular science content: the formation of the creative collective and the concept of medium of popular science content, which defines the general principles of its development (definition of features of functional and reader appointment, meaningfulness of content, artistic design, convergence decisions). So, by the hierarchical ranking we distinguish the following basic principles: strategic management, reader centricity, functionality, meaningfulness, aesthetics and convergence (Tab. 1).

Table 1. **The basic level of the conceptual model of popular science information resource (IR)**

Principles	Forms, methods, means	Results
Strategic management	<ul style="list-style-type: none"> – consolidation of scientists, professionals and amateurs; – studying the experience of creating an IR; – implementation of strategic management of IR 	<ul style="list-style-type: none"> – formation of the strategic concept of IR development; – creation of high-quality content; – creative and commercial competitiveness of IR
Reader centrality	the concept of IR should be an integrated model designed to satisfy the information needs of all categories of consumers	<ul style="list-style-type: none"> – segmentation of the readership groups according to information needs; – management of information needs of the audience; – modification of the IR concept according to information needs
Functionality	adherence to the stylistic-typological features of the popular science IR	providing society with popular science information
Meaningfulness	<ul style="list-style-type: none"> – publication of reliable, exhaustive information; – diversification of the subject of IR by adjacent branch materials 	<ul style="list-style-type: none"> – formation of specialized mass media; – amplification of the purpose-oriented audience; – expansion of the IR authors' group
Aesthetics	use of modern design technologies	<ul style="list-style-type: none"> – facilitating the perception of textual information; – increasing of the profitability
Convergence	<ul style="list-style-type: none"> – integration of various communication channels because of specific media expansion; – creation of multilingual electronic versions; – use of cooperation with domestic and foreign IR 	<ul style="list-style-type: none"> – implementation of multiplatform IR project; – amplification of the purpose-oriented audience; – facilitation of information needs satisfaction; – amplification of sales market; – increase of competitiveness; – implementation of related diversification projects

Such basic principles as strategic management, reader centrality, functionality, meaningfulness, and aesthetics can be considered as traditional principles of journalistic creativity. However, the active development of information technology, the permeation of market relations into the mass communication field led to the introduction to the system the basic principles of convergence. Researchers point to the transformational nature of the information and technological convergence factor, which provides not only the reproduction of old models, but also the appearance of new media platforms that significantly change the media and as a way of presenting and formatting information, and as a way of its consuming.

The phenomenon of convergence becomes possible thanks to the development of digital technologies that provide a single technology platform for broadcasting media content. Digitality allows to create competitive advantages in the struggle of journalism, advertising, PR. Content consumption becomes more mobile, flexible, individual, interactive, managed. Therefore, convergence causes a change in the object of competition – from the time to attract the attention of consumers of information [Komova 2014, p. 56 – 67]. According to prognostic assumptions, convergence is a process that will completely modify not only the media system but also all branches directly or indirectly related to them [Tsybalenko 2013].

To the variable level of the conceptual model, we have attributed strategic principles which are conditionally not vital to the information resource, but at the same time their implementation ensures compliance with the stylistic and functional features of medium of popular science content and its commercial success. So, the variable level of the conceptual model of the popular science information resource is formed with principles: creativity, sensationalism, content balance, quasi-presence, interactivity, author’s quota, authenticity, controversy, promotion.

During hierarchization of variable level principles we proceed from the assumption that they are implemented for the concretization, addition, evolution, modernization, and the detailization of the basic principles to expand the possibilities to achieve the expected results. Therefore, the possibility of applying each variable principle for strengthening the basic principles was considered by the logical analysis of these notions and it was found in the form of a two-dimensional matrix (Tab. 2). That is, if a certain variable principle can strengthen the basic one, then at the intersection we get the sign "+".

Table 2. **The matrix of the use of variable principles to strengthen the principles of basic level**

Variable Basic	Creativity	Sensationalism	Content balance	Quasi-presence	Interactivity	Author’s quota	Authenticity	Controversy	Promotion
Strategic management	+	+			+				+
Reader centricity	+	+	+	+	+	+	+	+	+
Functionality	+	+	+			+	+	+	
Meaningfulness	+	+	+	+	+	+	+	+	
Aesthetics	+		+	+					
Convergence	+	+	+	+	+				+

The matrix of the use of variable principles to strengthen the principles of basic level enabled formation of hierarchical rating of variable principles of the development of medium of popular science content (Fig. 1).

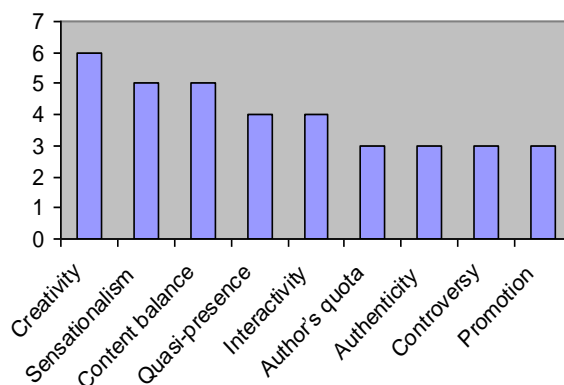


Fig. 1 Hierarchical rating of variable principles of IR development

That is, variable principle has the higher rating, the more basic principles it can strengthen. According to this rating the variable principles were hierarchized in the table conceptual model (Tab. 3).

Table 3. The variable level of the conceptual model of popular science IR

Principles	Forms, methods, means	Results
Creativity	<ul style="list-style-type: none"> – selection of actual, interesting topics; – presentation of science and technology achievements, personalities; – preparation of special thematic numbers; – creation of various original, innovative forms of material presentation; – creation of new communication channels 	<ul style="list-style-type: none"> – stimulation of interest in scientific and technical creativity; – raising the status of science and scientist; – improvement of the quality of information needs; – increasing the competitiveness of IR; – brand formation
Sensationalism	<ul style="list-style-type: none"> – submission of content from the "first hands"; – informational monitoring of the achievements of science and technology; – maintaining of contacts with newsmakers; – attracting of amateurs 	<ul style="list-style-type: none"> – development of public relations; – feedback setup; – prioritization in publishing materials
Content balance	observance of correlation between text and illustrations, local and world themes content	optimization of the combination of informative and aesthetic IR components

Quasi-presence	<ul style="list-style-type: none"> – text visualization by a wide illustration; – using of narratives; – placing on the IR website professional and amateur photo and video works 	amplification of the purpose-oriented audience by facilitating the perception of information, in particular, for people with special needs
Interactivity	using of feedback technologies	monitoring of the information needs evolution
Author's quota	setting the percentage of domestic publications	formation of interest in domestic science
Authenticity	implication of foreign authors	publication of nationally colored articles
Controversy	<ul style="list-style-type: none"> – publishing the analytical materials; – inlighting the alternative scientific hypotheses and views 	<ul style="list-style-type: none"> – formation of critical thinking; – realization of educational, ideological functions of IR
Promotion	<ul style="list-style-type: none"> – advertisement of educational institutions; – informing about scientific and educational programs, grants; – advertisement of achievements of science; – popularization of scientific activity of personalities 	<ul style="list-style-type: none"> – promotion of sponsorship in the field of science; – promoting the commercialization of science; – raising the social status of a scientist and a scientist; – promotion of professional orientation

The base of the table conceptual model is the system of two-dimensional coordinates:

- in the horizontal dimension, the model reproduces the causal relationship between the principles of the development concept of medium of popular science content, which are its input characteristics, and the expected results of their implementation, which are the output characteristics of the research object;

- in the vertical dimension, the principles of the concept are stratified and presented in accordance to the hierarchy of importance. The use of the hierarchy approach is necessary because it enables the components of a complex system, which is an informational model, to be identified, and to position the totality of local subsystems, each of which contains an informational and management component that are closely interrelated [Kadomtsev 1999, Nikolis 1986].

The informational component of the conceptual model of medium of popular science content is related to the purpose of its creation and is determined by the structure of feedback. The essence of this phenomenon is the interactivity of the connections between input and output characteristics in a horizontal dimension. This is manifested in the possibility of establishing mutual causal relationships:

- direct communication “principle → form”, when implementation of a certain principles through the use of specific forms and means allows to obtain the expected result;
- feedback “form → principle”, when first of all the desirable result, which can be obtained by varying the principles or modifying the forms and means of their implementation, is determined.

As management component we understand the interconnections in horizontal dimension between each concept principle and obtained output result of its realization.

Thus, the developed model is a complex system, which is in a state of continual informational interaction (exchange) with the external environment (technological, educational, cultural, political, socio-economic factors) (Fig. 2).

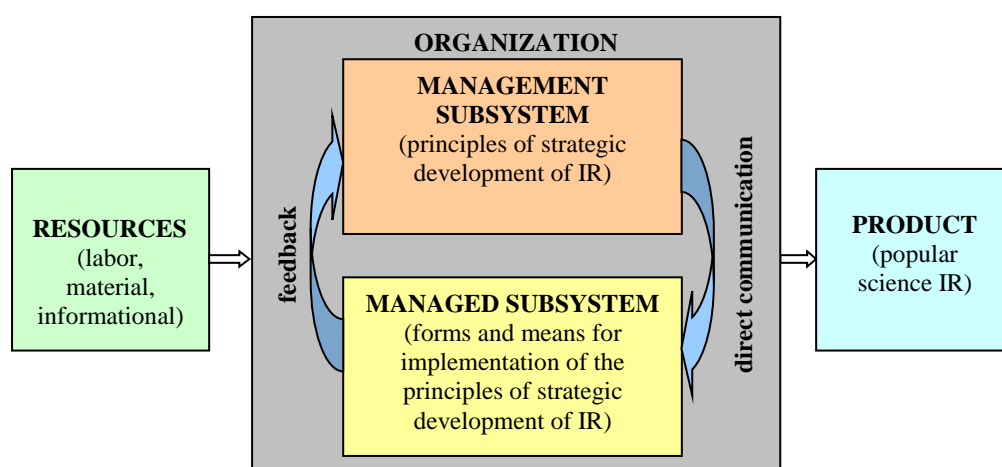


Fig. 2. Scheme of the popular science IR functioning

At the same time, this complex system has the ability to self-organization, which consists of the internal modification of the system without direct influence of the external environment. This self-organization is achieved in consequence of the existence of a feedback between the management and the managed subsystems.

Graphic conceptual model. The graphical conceptual model (Fig. 3) illustrates the system of interconnections between the basic and variable principles of strategic planning and determines the degrees of strengthening the basic principles by the variable ones. The degrees of strengthening were determined and Tabl.2 as follows:

1) on the basis of the Fig. 1 the variable principles with the same rating were grouped together: 1) creativity; 2) sensationalism, content balance; 3) quasi-presence, interactivity; 4) author’s quota, authenticity, controversy, promotion;

2) through the correlation of Tab. 2 with grouped variable principles, degrees of strengthening for each of the basic principles were formed:

- strategic management: 1 degree (creativity); 2 degree (sensationalism); 3 degree (interactivity); 4 degree (promotion);
- reader centrality: 1 degree (creativity); 2 degree (sensationalism, content balance); 3 degree (quasi-presence, interactivity); 4 degree (author's quota, authenticity, controversy, promotion);
- functionality: 1 degree (creativity); 2 degree (sensationalism, content balance); 4 degree (author's quota, authenticity, controversy)
- meaningfulness: 1 degree (creativity); 2 degree (sensationalism, content balance); 3 degree (quasi-presence, interactivity); 4 degree (author's quota, authenticity, controversy)
- aesthetics: 1 degree (creativity); 2 degree (content balance); 3 degree (quasi-presence);
- convergence: 1 degree (creativity); 2 degree (sensationalism, content balance); 3 degree (quasi-presence, interactivity); 4 degree (promotion).

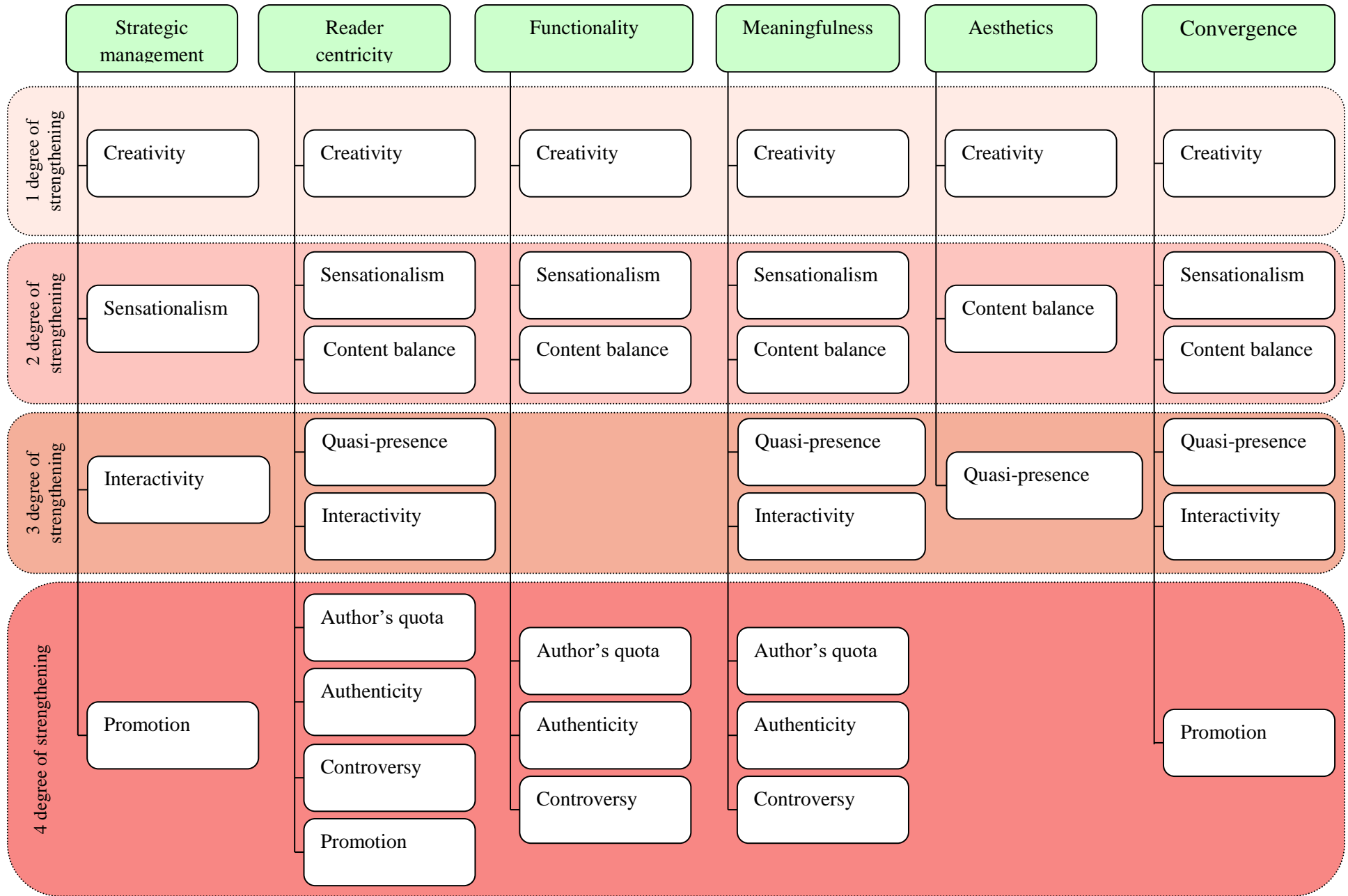


Fig. 3 The graphical conceptual model of popular science IR design

The table and graphic models are not identical, namely, the graphic model does not duplicate tabular: the basis of their construction are different approaches for reflection of the relationships between the basic and variable principles.

The table conceptual model reflects the hierarchy of the basic and variable principles by the overall rating of use, that is, the connections are reproduced in a linear dimension, where the principles of the basic and variable levels are arranged vertically in series according to the rating. Relationships between single basic and variable principles are not established.

The graphic model is based on the matrix of the use of variable principles to strengthen the principles of basic level (Tab. 3). This model reflects the system of interconnections between the basic and the variable principles in the aspect of establishing the degree of potential of variable principles for strengthening the qualities of the basic ones, their development and modification.

The hierarchy of the basic principles is a chain of consecutive connections, each connection of which is the basis for the implementation of the next. The hierarchy of variable principles is presented as a two-dimensional step-level system for strengthening the basic level. In the horizontal dimension, the degrees of basic level strengthening in general are highlighted. In the vertical dimension, the degrees of strengthening of each basic principle are presented. As the analysis shows, the greatest potential for the development of medium of popular science content lies in the implementation of the principle of reader centrist, since it can be strengthened by the largest number of variable principles.

Model description. The developed model in its essence is a tool for detection of the stylistic and typological features of a commercially successful medium of popular science content through a system of strategic development principles which ensure the achievement of certain qualitative results by the use of various forms and means of knowledge popularization.

In its typology, the conceptual model is informational descriptive, since it is represented as a structural-functional system, divided into separate elements and subsystems, which are connected by hierarchical and causal relations. The elements of developed model are input (basic and variable) characteristics of object (popular science information resource).

The input basic characteristics are the basic principles of strategic development (Tab. 1), which directly provide the implementation of functional, stylistic and typological features of the popular science mass media. The input variable characteristics are variable principles (Tab. 3) that can be applied to enhance or complement the functional media structure in full, and can be used selectively during strategic planning to achieve certain goals (marketing, increased competitiveness, implementation of related activities).

The output characteristics are the expected result (Tab. 1; Tab. 3) from the implementation of the principles of strategic planning of medium of popular science content. The model allows by selecting and varying the object input characteristics to predict its possible output characteristics.

Conclusions

The basis of the concept of modeling the medium of popular science content is the opinion that the successful functioning and competitiveness of the content medium is the result of strategic design as a mechanism of social management.

The use of strategic planning methodology (foresight) in development of the conceptual model of medium of popular science content gave the opportunity to take full account of the features of its stylistic and typological characteristics, based on the potential of integration of journalistic skills, innovative marketing and information technology. Stratification and hierarchization of the basic principles of strategic development reflect the key components of the conceptual model of medium of popular science content, which, in their indissoluble dialectical relationship, make the creative, communicational, technological and commercial frame of its design.

All stratified variable principles have implicit influence on the basic level of the functioning of medium of popular science content and can be applied to strengthen all the basic principles, and at the same time, hierarchical ranking illustrates the area of maximum implementation of each variable principle to strengthen each of the basic ones.

The creativity has highest potential because of ability to strengthen all the basic principles: both during the formation (modification) of the creative concept, the formation and development of informative and artistic content, and the implementation of convergence processes. This testifies that a creative approach is a necessary component of success in all areas of the functioning of medium of popular science content, because it is directed to design original, innovative forms and methods of journalistic art, which in its integrated summary is capable to generate a qualitatively new mass-media product.

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