Research on the Factors Causing the Information Cocoons of Scientific Researchers

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Abstract

This study obtained relevant literature through channels such as the internet and libraries, and sorted and summarized the literature. Starting from the perspectives of individual abilities, information dimensions, and social environment, a model of the influencing factors of the information cocoons effect was constructed. Through the distribution of survey questionnaires and in-depth interviews, the influencing factors of the information cocoons phenomenon were verified.

Keywords

Information cocoons, researchers, individual abilities, information dimensions, social environment.

1. Introduction

The era of digital intelligence refers to the rapid development of information technology and artificial intelligence, which has had a profound impact on various fields such as society, economy, and technology. The Internet gathers information from different sources, providing users with great space to choose and utilize, while also placing higher demands on their information ability and demand cognition. The amount of information is exploding, and users are gradually losing control of the information. With the rapid growth of various types of digital information, researchers need to spend a lot of time and energy to obtain valuable academic information, resulting in new problems of information overproduction and insufficient resource utilization. Researchers are also facing the challenge of the information cocoons effect.

The so-called information cocoons effect refers to the phenomenon where researchers often focus only on knowledge and research results in a specific field and neglect relevant information in other fields when conducting research due to limited access to information or personal interests and preferences. This limitation may lead to researchers lacking interdisciplinary perspectives and inspiration, limiting their development of innovative thinking and the quality of research results.

2. Literature Review

In order to study the information cocoons effect, some scholars have conducted relevant researches. They usually identify the research scope and influence of researchers by analyzing their paper publications, collaboration networks, citation relationships, and research topics. The information cocoons, echo chamber effect, and filtering bubble are three important concepts that describe the phenomenon of information narrowing caused by information bias. In 2006, Professor Cass R. Sunstein of Harvard University first proposed the concept of information cocoons in his classic book "Information Utopia". The basic connotation of the information cocoons is that information users generally only pay attention to the information and content they are interested in, immerse themselves in the information world where they

feel happy and comfortable, and live in the information cocoons they weave like cocoons. Another concept closely related to it is the "echo chamber effect" proposed by Cass R. Sunstein in the "Republic of the Internet", that is, people tend to hear the same voice, but this also makes them more isolated, unable to hear the opposite voice, and ultimately leads to the strengthening of information and views in a closed circle. Outside of Cass R. Sunstein, the concept of "filter bubble" proposed by Eli Pariser directly emphasizes the impact of information filtering on users. He believes that algorithms represented by search engines filter out heterogeneous information by understanding user preferences, creating a personalized information world for users while building a "barrier" that puts them in a "network bubble" environment and hinders the exchange of diverse perspectives.In 2009, Cheng and Shen explained and reconstructed the relevant theories of organizational communication from the perspective of technological progress and the evolution of communication laws, combined with the phenomenon of information aggregation and information cocoons in the digital era, and initiated research on the information cocoon in China[1]. Liang conceptualized the concept of information cocoons and reintegrated and analyzed Sunstein's research on information cocoon houses[2].

Wang Qian took Today's Headlines as the research object, analyzed more than 8000 news push messages from 77 users, and used Content analysis to explore the criteria for automatic selection and measurement of news value. The research found that today's headlines algorithm values mainly include four elements: scene, content, user preference and platform priority[3]. Tang and Zhao took Tiktok APP as an example, based on big data algorithm technology, to explore the current situation of Tiktok communication in the perspective of big data, and found a series of social problems such as the monotony of communication content and social value[4].

Some scholars analyze the influencing factors of the information cocoons effect from the perspectives of user behavior and informatics theory. Scholars such as Sindermann C have found that users' own characteristics, such as gender, age, personality, and other personal factors, can have an impact on the formation of information cocoons[5]. Wang used the information gain theory to analyze the correlation between various influencing factors and the information cocoon room level, and constructed the information cocoon room level sensitive influencing factor model from the four sub dimensions of algorithm recommendation technology, user information literacy, system interaction and user behavior characteristics, and then built the information cocoon room level prediction model through the support vector machine theory[6]. It can be seen that there is relatively little research on information cocoons at present, with research cases mainly focused on personalized recommendation platforms such as Weibo and Today's Headlines. The research object is relatively single, and with the increasing abundance of information resources, users do not only use a single platform as a source of information, so research should not be limited to a certain digital platform. And existing research mainly focuses on the causes and formation mechanisms of information silos among specific groups such as online users, while there is a relative lack of research on researchers.

3. Research Methods

After studying and analyzing the current situation of information cocoons among researchers, this study is based on user behavior analysis theory and related psychological theories to sort out the influencing factors of information cocoon effect among researchers, propose hypotheses, and explore the effects of individual factors, information environment factors, and social environment factors on researchers' perception of information cocoon effect and willingness to break through. In order to gain a more accurate understanding of the situation of researchers, this study selected survey subjects who are required to have at least 3 years of scientific research experience and have certain academic achievements in the professional field

they are engaged in. This study distributed 100 survey questionnaires through the Questionnaire Star platform, with 90 valid questionnaires, to understand the academic preferences, social interactions, and the impact of academic information on research among researchers.

3.1. Descriptive Statistics

Through basic information analysis, the number of male and female respondents is generally equal, with a large age range ranging from 26 to 60 years old. The education level covers undergraduate, master's, and doctoral levels, and the research disciplines cover humanities, social sciences, science, engineering, medicine, and other disciplines. The identity of the survey subjects includes university teachers and graduate students, librarians, researchers from research institutes, and relevant personnel engaged in research work in enterprises or government departments. In terms of regional distribution, there are researchers from both the eastern region and the central and western regions.

3.2. Influencing factors of information cocoons

The formation and influencing factors of the information cocoon effect among researchers are multifaceted, and can be discussed from three levels: personal ability, information factors, and social environment.

3.2.1. Personal abilities

The abilities of scientific researchers in information retrieval, information acquisition, and information demand expression all affect the formation of information cocoons. Researchers receive in-depth training in their professional fields, forming their own professional knowledge and skills, making them more inclined to conduct research in familiar fields and neglecting knowledge and ideas in other fields. Moreover, every researcher has a research direction, and interest preferences may make them more interested in a specific field, neglecting research opportunities in other fields. In order to gain academic advantages and reputation, researchers may be more willing to delve into a particular field and neglect cross disciplinary research in other fields. In addition, researchers often need to complete research projects within limited time and resources, and often cannot invest enough time to understand knowledge and research achievements in other fields.

3.2.2. Information dimensions

Researchers usually obtain information through channels such as academic journals, conferences, and partnerships. They usually only focus on specific journals and thematic literature, and rarely consult literature published in non core journals. This reflects that the fixed and narrow sources of information can to some extent promote the formation of information cocoons for researchers. Different disciplinary fields have their own academic traditions and research norms, and researchers are influenced by them to tend to conduct research within the traditional theoretical framework, neglecting cross disciplinary thinking in other fields. Some academic evaluation indicators focus on the number of SCI papers and citations in a certain field, which makes researchers more inclined to focus on research in existing fields and not actively engage in interdisciplinary cooperation. Information carriers can also affect the access of researchers to information, and many researchers are unwilling or unable to understand foreign language, mathematical, and code related literature.

3.2.3. Social environment

Social environment is an important factor influencing the formation of information cocoon room for scientific researchers under the network environment, including policy environment, social relations, Opinion leader and other key factors. The policy environment refers to the research policy environment of the country, research institutions, and other units. Discipline segregation exists in some academic institutions, and the communication and cooperation

mechanism between different disciplines is not perfect, which limits the motivation and opportunities for researchers to carry out Transdisciplinarity. There is a lack of encouragement and support mechanism for Transdisciplinarity, and researchers may encounter difficulties and resistance, so they can choose to be limited to their own areas of expertise. The social relationships of researchers are usually relatively simple, with a small social circle and a relatively fixed communication group. In addition, some respondents tend to read the academic achievements of well-known scholars and even imitate their academic behavior, lacking their own innovation.

4. Conclusions and Suggestions

If researchers focus too much on their familiar fields, they may miss out on the collision of new knowledge and ideas in other fields, thereby limiting the possibility of innovation. Therefore, promoting the cracking of the information cocoon effect and promoting communication and cooperation between different disciplines has become an important topic in scientific research management and policy formulation. To address the information cocoon effect, some measures have been proposed[7]. For example, encouraging interdisciplinary collaborative research and promoting exchanges between different fields through organizing academic conferences, seminars, and other activities; Promote the participation of scientific researchers in multidisciplinary projects and introduce experts from various fields for cooperation; Information technology methods can also be used, such as building knowledge link networks between disciplines, providing researchers with more comprehensive information resources, and so on. In short, the information cocoon effect is a challenge faced by researchers in the era of digital intelligence, but through cooperation, communication, and innovation, we can try to overcome this challenge and promote the progress of scientific research.

Acknowledgements

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