Journal of Global Information Management
Volume 29 • Issue 6 • November-December 2021

Revealing the Dark Side of the Internet: A Governance Framework Based on Users' Negative Psychology

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ABSTRACT

The purpose of this study is to reveal the dark side in the development of the internet and to establish a hierarchical framework for exploring its governance path based on users' negative psychology. However, the establishment of a hierarchical governance framework is a process of dealing with the interrelationships between aspects and criteria. Therefore, a decision-making and trial evaluation laboratory (DEMATEL) is proposed to manage these complex interrelationships, and interpretive structural modeling (ISM) contributes to dividing the hierarchy. The results show that (1) the institutional system is the driver of internet governance improvement, (2) personal values are the last link in the governance process, (3) the governance transition from the institutional system to personal values must cross the barriers of ethics and technology, and (4) the governance framework for the dark side of the internet must be built based on four aspects: the institutional system, ethics, technology, and personal values. This paper focuses on the negative psychological problems of Internet users and proposes a more systematic and integrated hierarchical framework, providing theoretical guidelines for governing the dark side of the internet.

KEYWORDS

Dark Side, DEMATEL, Fuzzy, Hierarchical Framework, Internet, ISM, Negative Psychology

1. INTRODUCTION

While the development of the Internet provides users with resources and convenience, it also has a negative impact on their psychology. Many scholars have pointed out that there is a close relationship between the use of the Internet and users' mental health and negative behaviors at home and at work (Caplan, 2002). Use of the Internet can lead to pornographic violence (Davis and Wright, 2019), reduce interpersonal communication skills (Akbulut et al., 2016), exert a negative impact on work and life due to Internet addiction (Stavropoulos, 2016), or negatively impact the user's psychology because of long-term exposure to inappropriate information (Schäfer, 2019). Therefore, optimizing the Internet usage environment (Human Rights, 2008), controlling and restricting Internet information

DOI: 10.4018/JGIM.20211101.oa29 *Corresponding Author

and specifically addressing different Internet subjects are effective ways of addressing the negative impact of the Internet; these steps have also been advocated by existing institutions (Leung, 2009). In this research, the Internet is divided into the following three subjects, i.e., the social Internet (social network service platforms such as live broadcasts and Weibo), third-party platforms (peer-to-peer (P2P), advertising, takeout, travel, payment platforms, etc.), and websites (news media, games, etc.), and this paper discusses the different versions of the Internet contained in these three subjects.

However, although scholars have made many efforts to study the governance of the dark side of the Internet, there are still many gaps. At present, research on the dark side of the Internet is characterized by a singularity of perspective and the specification of objects. In terms of the singularity of perspective, most scholars advocate addressing negative issues from an institutional perspective, arguing that the lack of institutions is the root cause of the negative impact of the Internet, and they propose that the construction of regulatory systems and related laws must be continuously strengthened (Johannes, 2017). From the perspective of Internet security technology, some scholars emphasize that technological vulnerabilities will bring unknown Internet risks and that improving technological security and risk prevention technologies will prevent more fraud (Truex, 2019). With the rise of artificial intelligence and blockchain technology, the use of new technologies, while providing convenience and trading space, will have more negative effects on users, such as privacy leaks (He et al., 2018). The framework for the application of new technologies must be more complete and avoid loopholes. In addition to the above studies, scholars have advocated training Internet companies from a business ethics perspective, fostering a sense of social responsibility and popularizing cultural knowledge from the perspective of values, and establishing the correct internalization attitude of users (Desmond et al., 2013).

Furthermore, in terms of object singularity, scholars have identified existing Internet subjects and proposed suggestions. For example, specific research has been conducted on social media platforms, P2P platforms (Francis and Martins, 2019), online trading and information publishing platforms (Liu, 2018), and game entertainment platforms (Alessandro and Gabbiadini, 2012). Unfortunately, to systematically address negative issues, governance at a single level or for specific objects is difficult due to the diversity of Internet subjects and the characteristics of users. In particular, due to the mutual constraints and influences between different levels, such as technological changes and widespread application, the application of governance schemes proposed by existing research is usually restricted by the completeness of the institutional system (Herman, 2019). Finally, existing research lacks a systematic consideration of the negative psychology of Internet users and a multilevel governance framework based on the negative psychology caused by the Internet. This dearth of research has led to a failure in managing the negative psychology of the Internet and understanding the dark side of the Internet.

Based on these observations, this article summarizes 12 types of negative user psychology: anxiety and depression, fickleness, emotional influence, panic, insecurity, paranoia, cyber violence, overconsumption, blind obedience, crime, violent tendencies and culture shock. These types are grouped into six categories: negative emotions, illegal behaviors, insecurity, distortion of values, Internet addiction, and culture shock. Based on these six categories, this article explores the causes of negative user psychology based on three subjects: social network service platforms, third-party platforms, and websites. This paper proposes targeted governance solutions based on the causes of users' negative psychology and establishes a governance framework of the Internet to address users' negative psychology. First, to fully control the dark side of the Internet and its negative psychological impact on users, an effective standard is proposed based on four aspects: the institutional system, ethics, technology, and values. Second, considering the mutual restriction among attributes, it is necessary to integrate fuzzy set theory, a decision-making trial and evaluation laboratory (DEMATEL) and interpretive structural modeling (ISM) to make multi-attribute decision among multiple attributes. Third, combined with the above analysis and review of the previous literature, a governance framework for the dark side of the Internet is constructed based on four levels to govern users' negative psychology.

This study makes a threefold contribution: (i) a hierarchical framework is developed with regard to the 12 types of negative user psychology caused by the Internet noted above, and governance should start based on four aspects: the institutional system, ethics, technology, and values. (ii) The model addresses the dilemmas stemming from complicated interrelationships during performance assessment using qualitative and quantitative data and finds that the four layers have different levels of importance. Institutional criteria constitute the first level, composing the root of the influence of the dark side of the Internet. It is critical to determine how to effectively track and control these factors. Business ethics and technology constitute the second and third levels, and complex interactions and constraints exist between them. Finally, this study finds that personal values constitute the fourth level, showing that if people's values need to be changed, the threshold of ethics and technology must be crossed and that there are certain obstacles between the institutional system and personal values. (iii) This study provides guidelines for managing the dark side of the Internet and users' negative psychology.

2. LITERATURE REVIEW

At present, the rapid development of the Internet has exerted negative effects on users' psychology. Combining the existing literature, this paper summarizes twelve types of negative user psychology: anxiety and depression, fickleness, emotional influence, panic, insecurity, paranoia, cyber violence, overconsumption, blind obedience, crime, violent tendencies and cultural shock (Table 1). The detailed psychological states in previous research were summarized and integrated into negative emotions, distorted values and so on. Referring to some of them, this paper further classifies the twelve types of detailed negative psychology into six categories: Internet addiction, negative emotions, insecurity, distortion of values, illegal behaviors and culture shock. The classification is conducive to establishing and discussing a governance framework for the dark side of the Internet based on users' negative psychology.

2.1. Internet Addiction

Internet addiction, also known as problematic Internet use (PIU) and Internet dependence, refers to the out-of-control over Internet use (Young, 1999), and it can lead to serious neurological damage, psychological anxiety and social problems in daily life (Gentile et al., 2016). Continuous use of the Internet may cause an imbalance of the positive forces in users' lives, promote the abuse of the Internet. The imbalance may become a habit-forming behavior leading to problematic dependence on the Internet (Turel and Qahri-Saremi, 2019). Considering the number of Internet users and the important problems of Internet addiction, it is necessary to continuously check the potential risks of pathological Internet use (Carli et al., 2018).

2.2. Negative Emotions

2.2.1. Anxiety and Depression

Current studies have found that those who used the Internet more often were more likely to experience anxiety and discomfort compared to when such users did not use the Internet (Rudolf, 2019). It has been demonstrated that individuals without a tendency toward health worries may have elevated levels of distress/anxiety after conducting Internet searches (Baumgartner et al., 2016).

2.2.2. Fickleness

Current research on "the seductive details" shows that learners maybe easily distracted by pages contain pictures and videos. (Elizabeth, 2019). Classic research on the "lure of the seductive detail" makes it clear that learners can be easily distracted by pages containing photos and videos (Fries et al., 2018; Garner et al., 1989). Excessive Internet use may cause attention deficit hyperactivity

Table 1. Summary of the negative psychological impacts of the Internet on users

Negative psychology	Routes of the impact	Basis	Literature
1. Anxiety and depression	Websites (news media)	The imperfection of the legal system will lead to a difference in laws and regulations on whether a certain act violates privacy protections, and the system will be unable to effectively guarantee the privacy security of the subject.	Chen, 2019; Richelle, 2016
	Third-party platforms (travel platforms)	Attacks against platform network service providers occur frequently, reflecting the incompetence of the original governance model from the opposite side.	Rudolf, 2012
		Problematic Internet use (PIU) has characteristics of addiction and is associated with anxiety, depression, and other negative sequelae in youth in different countries.	Elhai, 2018; Nursen, 2011
2. Fickleness	Third-party platforms (advertising platforms)	The legal system is imperfect, and supervision is absent. The concealment and openness of cyberspace and the anti-reconnaissance of some illegal elements make it difficult for the government to supervise online advertising.	Song, 2019; Hinduja, 2008
	Social network service platforms (live network platforms)	Classic research on "the lure of the seductive detail" shows that learners are easily distracted by pages that contain photos and videos.	Aboujaoude, 2006
3. Emotional influence	Websites (news media)	In the process of developing network news, due to the lack of supervision, there are some negative problems in guiding public opinion.	Jennifer, 2019; Brenda, 2020
4. Panic	Third-party platforms (travel platforms)	There is still a certain lag in legislation on online car-hailing services. The development of the Internet is dynamic, and the original legislation cannot effectively adapt to the development of the Internet.	Lim, 2012
5. Insecurity	Third-party platforms (takeout e-commerce platforms)	The virtual nature of the Internet greatly intensifies the information asymmetry involved in Internet takeout services. Consumers cannot see the production process and environment, and it is difficult to know the hygienic environment of food production.	Liu, 2012
	Third-party platforms (travel platforms)	The lack of auditing on the installation end provides an opportunity for the existence of "black cars".	Du, 2018
	Third-party platforms (online payment platforms)	The construction of a network payment management framework obviously lags behind the development speed of such platforms. There are credit problems in financial circles.	Yang et al., 2019; Sandra, 2003
	Third-party platforms (travel platforms)	Attacks against platform network service providers reflect the weakness of the original governance model from the opposite side.	Chen, 2012
6. Paranoia	Third-party platform (advertising platforms)	It is still difficult for the law to understand/ define rules of responsibility for false advertising.	Carli et al., 2013 JoséEstrada, 2012
7. Cyber violence	Social media service platforms (Weibo)	Victims of incidents are attacked with violent words, especially extreme views and language.	Sun, 2019

continued on following page

Table 1. Continued

Negative psychology	Routes of the impact	Basis	Literature
8. Overconsumption	Third-party platforms (online shopping platforms)	The laws for online installment purchase platforms are not perfect. For example, an installment purchase platform will use legal loopholes to protect its own interests and conceal its real and effective information.	Yang, 2019; Brenda, 2019
	Social network service platforms (live network platforms)	The functions and powers of functional departments are unclear. The regulatory bodies are diversified. Legal liability provisions are unclear. The mechanism of industry self-discipline is not perfect.	Akdeniz, 2001; Richelle, 2016
9. Blind obedience	Social network service platforms (live network platforms)	Video audits of apps are entirely completed by enterprises, and cultural supervision, public security departments and other agencies are not involved. This is a shortcoming that must be rectified urgently.	Song, 2019; Hinduja, 2008
		Students are ideologically confused due to online information. The psychological confusion of a new generation of students is caused by computer networks.	Barasinska, 2014
10. Crime	Third-party platforms (P2P)	The credit risk of online lending is caused by the imperfect credit system before the transaction and the lack of legal supervision in the whole transaction process.	Alizadeh, 2011
	Third-party platforms (advertising platforms)	Current punishments are relatively light. Because of the concealment and openness of the network space, it is difficult for the government to supervise network advertisements.	Jiang, 2012; Ranney, 2014
	Social network service platforms (live network platforms	There is an increasing number of crimes and an increasing amount of corruption caused by networks.	Wang, 2019; Yu, 2014
11. Violent tendencies	)Websites (online games)	College students who often play games appear to have a state of mind in which they are exhausted, sleepy, irritable and aggressive.	Tu, 2019; Leung, 2012
12. Culture shock	Social network service platforms (WeChat, etc.)	Some college students escape the reality of setbacks and indulge in the phenomenon of social networking. With the traditional ethics in the virtual world of the network, anomie is inevitable.	Jiang, 2016; Kuss, 2012
	Social network service platforms (live network platforms)	In recent years, in the process of the rapid expansion of network video platforms and the blind pursuit of platform users' attention, there has been much noise and chaos.	Stjernekla, 2019
	Social network service platforms (online social platforms)	In terms of policy risk and public opinion analysis, microblog users have a higher degree of freedom, and their content is more difficult to monitor than that of blogs.	Liu et al., 2019

disorder (ADHD), with symptoms in adults that include distractibility and difficulties in maintaining goal-directed behavior that exceed those due to hyperactivity (M. Panagiotidi et al., 2017).

2.2.3. Emotional Influence

According to news media, cyber-bullying behavior has sometimes triggered targeted individuals to commit suicide (Larimer, 2016). Data indicate an association between users' difficulties regulating their psychology and their belief that the Internet might be useful as a means of distracting themselves from negative affective states, which in turn predict PIU (Silvia et al., 2016).

2.2.4. Panic

Because the Didi hitchhiking platform was frequently involved in attacks, it was removed from the Didi app in August 2018 (Yonghe and Lu, 2019). However, an attack involving Didi Taxi in 2018 created worries that predatory individuals were using the platform and created a degree of panic about user safety. Moreover, for large-scale takeout platforms and express delivery companies that are committed to "speed" and "convenience", personal safety and food safety issues in the process of rapidly delivering items may also cause worries about public safety.

2.3. Insecurity

The impact of the Internet on security can include personal/food safety, privacy security, security crises, and paranoia.

2.3.1. Personal/Food Security

As life moves faster and faster, takeout meals are becoming ever more popular. People are often in contact with takeout food vendors, but the lack of information disclosure about the food supply chain has led to panic and fear in regard to food safety. Since takeout services are a relatively widespread phenomenon in China, people tend to be confused with regard to general food safety, resulting in very little research on the safety of takeout food in existing English-language academic papers.

2.3.2. Privacy Security and Security Crises

We are increasingly vulnerable to data breaches and identity fraud online (Răzvan and Irina, 2015). In regard to the rapid development of car-hailing services in China, the loss of privacy is a serious problem (Jonathan, 2015). On the one hand, the application software may distract a driver's attention when driving, increasing the threats to safety. On the other hand, taxi hailing software in China lacks the ability to audit who installs it, providing an opportunity for unlicensed or unregulated "black car" drivers (Du, 2018).

2.3.3. Paranoia

The virtual nature of the Internet makes people appreciate fun and novelty that might otherwise be lacking in their lives, but it also makes people more skeptical and hesitant about information on the Internet and feel powerless to address this issue, which in the long run will affect the healthy development of the character of users (Li et al., 2002). There has been research on the impact of third-party platform payments. Developers of merchant payment systems often disobey the process model or payment processes, which may lead to potential security flaws (Yang et al., 2019).

2.4. Distortion of Values

2.4.1. Cyber Violence

For more than a decade, social media have become "a vehicle for youth violence" and have dramatically changed the pattern of aggression (Patton et al., 2014). An increasing number of studies have focused on understanding "electronic attacks", which are described as an "emerging public health problem" (David and Hertz, 2007). At the same time, social media have introduced new forms of attack and violence that take place only online. Research has found that online bullying and harassment, including threats or unwelcome and inappropriate sexual remarks transmitted through social media, are common among adolescents (Hinduja and Patchin, 2008; Hinduja and Patchin, 2009, Lim et al., 2012).

2.4.2. Overconsumption

Impulse purchases are defined as unplanned and sudden purchases, usually accompanied by cognitive and emotional responses (Rook, 1987). Chen and Zhang (2015) reported that impulse purchases are frequent among Chinese consumers, which is a cause for concern because of the popularity and convenience of online shopping. Meanwhile, college students practice "conspicuous consumption" and "comparative consumption". Many college students blindly pursue the acquisition of famous brands without considering their actual consumption level (Wu, 2018).

2.4.3. Blind Obedience

Among short video applications, TikTok is a newly emerging forces among short video applications. However, video content such as that on the WeChat app may seek to sell fake goods, pornographic or violent content, and vulgar kitsch. Driven by opinion leaders, it is easy to follow trends blindly and not distinguish truth from falsehoods, which could harm users (Song and Duan, 2019). This blindness of self-empowerment obviously breaks away from the rationality of the media empowerment mechanism, easily causing social instability, and it has a very prominent negative effect on cultural communication.

2.5. Illegal Behaviors

2.5.1. Illegal Fundraising

At present, there are still loopholes in China's relevant laws and regulations on P2P Internet lending. The number of Internet crime cases caused by this new type of lending platform is still increasing, and due to the lack of relevant laws and regulations, the relevant government departments are unable to find an appropriate legal basis to punish illegal acts carried out on certain platforms (Cao, 2019).

2.5.2. Violent Tendencies

In recent years, the popularity of online games has steadily increased, and these games are favored by college students because of their perceived entertainment value. Due to the strong elements of competition involved in these games, some players have violent emotional reactions, which affects the management of their emotions and can lead to violence.

2.6. Culture Shock

In addition, because the Internet has spawned many new "gaming" cultures, new ways of making online friends and participating in social channels may directly or indirectly threaten traditions or existing cultures (Liu et al., 2019). Moreover, the rapid development of science and technology has enabled the dissemination of short videos, which promote the credo of "entertainment unto death" and are responsible for impacts on social and cultural values (Song and Duan, 2019).

A summary of the governance system for the dark side of the Internet is shown in Table 2.

3. METHODS

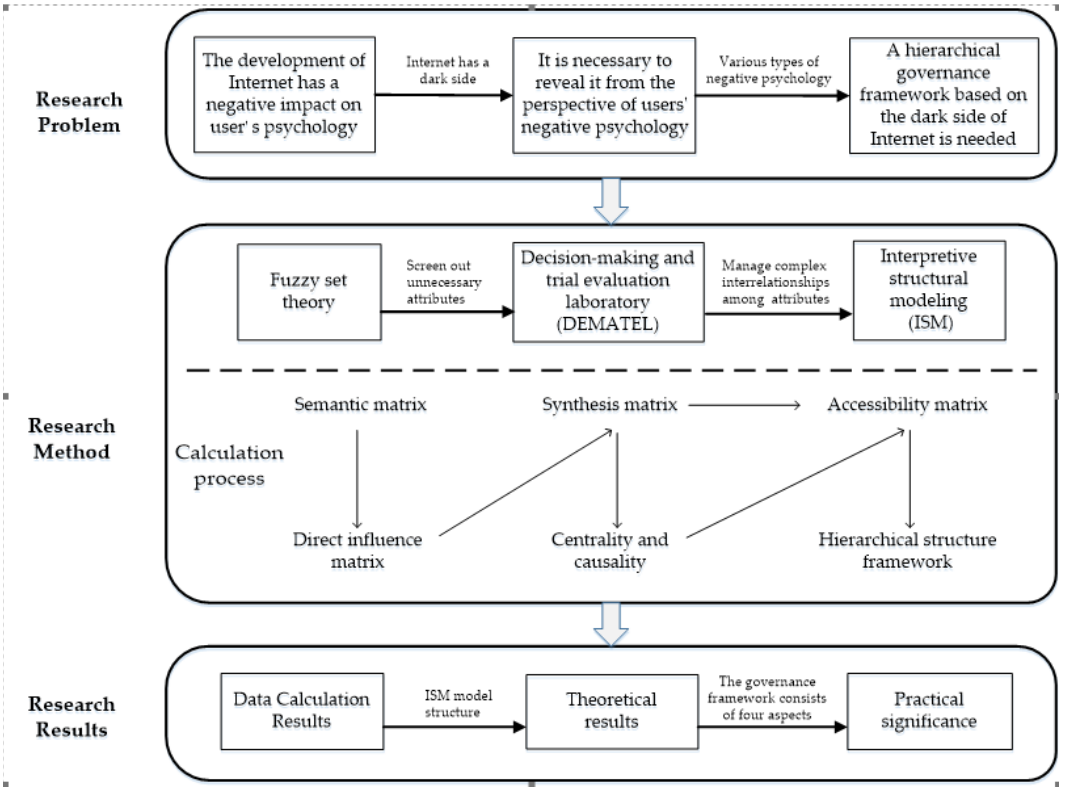
3.1 Research Design

Since the purpose of this paper is to construct a governance framework for the dark side of the Internet based on users' negative psychology, the research methods used in this paper must further clarify the complex interrelationships and importance of various aspects and criteria, as well as the hierarchical position of each dimension.

Accordingly, fuzzy set theory has the ability to capture the vagueness and uncertainty associated with data, and the DEMATEL contributes to addressing the complex relationships among the selected criteria. In addition, there are numerous similarities between ISM and the DEMATEL; for example, they both investigate the cause-and-effect relationship among multiple criteria. Therefore, to obtain

valuable results, a combination of fuzzy set theory, the DEMATEL and ISM is employed in this study. The whole process is shown in Figure 1.

Figure 1. Research design



3.2 Fuzzy DEMATEL

Fuzzy mathematics based on fuzzy set theory is applied to analyze the fuzzy degree of feature relevance. The triangular fuzzy number (TFN) provides an effective means of quantifying human linguistic preferences in a computable form (Opricovic & Tzeng, 2004). The purpose of fuzzy set theory, a preprocessing method, is to eliminate experts' subjective preferences and make the collected data more scientific and reasonable to be able to avoid the inevitable subjective preferences of experts while completing questionnaires. In addition, a fuzzy language evaluation scale is superior to a Likert evaluation scale (Hu, 2010).

The DEMATEL can be used to explore the relationship and the influence degree of various factors affecting the evaluation object and to reveal the causal relationship and importance of attributes to better evaluate problems and management decisions (Büyüközkan & Çifçi, 2012). The DEMATEL method is a decision-making tool based on graph theory and matrix calculation. It is used to analyze the importance of system factors and to help plan and solve problems (Lin &Tzeng, 2009).

The fuzzy DEMATEL is a method for simulating the human brain's processing of fuzzy information (Wu & Lee, 2007). This method retains the practical and effective advantages of the traditional DEMATEL method for factor identification. In addition, TFNs are used to replace the original accurate values, and this approach can improve the credibility of the analysis results and

Table 2. Summary of the governance system for the dark side of the Internet

Aspects	Criteria and Explanation	Internet Subject	Psychology	Literature
Institutional System	Review by the supervisory system is imperfect: it is difficult to unify the standards of the supervisory system, and supervision is not in place (C1).	Payment platforms, takeout platforms, second-hand transaction platforms and other platforms	Insecurity	Zhang, 2019; Akdeniz, 2001
	A detailed punishment system is lacking: specifically, a detailed punishment system with different standards is lacking (C2).	Advertising platforms, takeout platforms	Business fluke mentality and contempt for the law	Zhang and Xin, 2016
Ethics	Disclosure of private information: users' private information is maliciously disclosed to seek material interests (C3).	Social network service and news platforms	Insecurity of privacy disclosure	Mayshak et al., 2016
	Conspiring to spread false information: deliberately conspiring to spread false information to seek traffic (C4).	Advertising platforms, takeout platforms	Paranoia	Rudolf, 2012; Aboujaoude E, 2006
	Deliberately reducing the qualification standards for access: for example, some takeout platforms, second-hand transaction platforms, car rental platforms and other third-party platforms (C5).	Takeout platforms, second-hand transaction platforms, car rental platforms	Food/personal safety	Zhang and Xin, 2016; Alizadeh, 2011
	Deliberately concealing information: for example, concealing the information of both parties in an intermediary structure to seek material interests (C6).	Lending platforms (P2P)	Property safety	Hinduja, 2008; Barasinska, 2014
Personal Values	Extremism: the excessive pursuit of bloody, pornographic, violent and other ideological content (C7).	Live Internet platforms	Blind obedience and distortion of values	Yang et al., 2019; Sandra, 2003
	Education and training: establishing a perfect education and training system for different categories of people engaged in Internet work and improving the quality of personnel (C8).	Live Internet platforms	Blind obedience and distortion of values	Kyunghee et al., 2019; Aboujaoude, 2006
	Entertainment culture: the psychology of paying too much attention to entertainment and soft news (C9).	Advertising, news platforms	Fickleness	Song and Duan, 2019
Technology	Imperfect process tracking technology: unsafe hidden dangers caused by a lack of overall process tracking of commodities (C10).	Payment platforms, second-hand transaction platforms, car rental platforms	Insecurity	Yang et al., 2019; Sandra and Bo, 2003
	Weak risk prevention technology: due to weak prevention technology and a lack of foresight regarding the future, technology is pushed to the market prematurely, leading to frequent accidents (C11).	Payment platforms	Insecurity	Carli et al., 2013; JoséEstrada, 2012

provide a more valuable reference for the decision-making of managers. The fuzzy concept allows us to capture the human bias and uncertainty in the data that the DEMATEL cannot handle (Zimmermann, 2011). Therefore, this study uses the fuzzy DEMATEL method to explore the causal relationship and the influence degree between the criteria.

Step 1: Set up the system F_1, F_2, ..., F_n, to solve the purpose of this paper.
Step 2: Expert evaluation method is used to evaluate the influence of factors. The degree of influence is divided into five levels, as shown in Table 3.

Table 3. Semantic transformation

Linguistic variables	TFN
N (no influence)	(0, 0, 0. 2)
VL (very low influence)	(0, 0. 2, 0. 4)
L (low influence)	(0. 2, 0. 4, 0. 6)
H (high influence)	(0. 4, 0. 6, 0. 8)
VH (very high influence)	(0. 8, 1, 1)

Step 3: After the expert scores, the fuzzy number transformation is needed, four steps are included: Normalization of triangular fuzzy numbers:

$$xa_{1ij}^{k} = \left(a_{1ij}^{k} - \min a_{1ij}^{k}\right) / \Delta_{\min}^{\max} \tag{1}$$

$$xa_{2ij}^{k} = \left(a_{2ij}^{k} - \min a_{1ij}^{k}\right) / \Delta_{\min}^{\max} \tag{2}$$

$$xa_{3ij}^{k} = \left(a_{3ij}^{k} - \min a_{1ij}^{k}\right) / \Delta_{\min}^{\max} \tag{3}$$

Left and right value about the Normalization:

$$x\ ls_{ij}^{k} = xa_{2ij}^{k} / \left(1 + xa_{2ij}^{k} - xa_{1ij}^{k}\right) \tag{4}$$

$$x\ rs_{ij}^{k} = xa_{3ij}^{k} / \left(1 + xa_{3ij}^{k} - xa_{2ij}^{k}\right) \tag{5}$$

Calculation of clear value:

$$x_{ij}^{k} = \left[x\ ls_{ij}^{k}\left(1-x\ ls_{ij}^{k}\right)+x\ rs_{ij}^{k}x\ rs_{ij}^{k}\right] / \left[1-x\ ls_{ij}^{k}+x\ rs_{ij}^{k}\right] \tag{6}$$

$$z_{ij}^{k} = \min a_{1ij}^{k} + x_{ij}^{k} \times \Delta_{\min}^{\max} \tag{7}$$

Calculation of average clear value:

$$z_{ij}^{k} = \left(z_{ij}^{1} + z_{ij}^{2} + \ \cdots\ + z_{ij}^{k}\right) / n \tag{8}$$

Step 4: Standardization of direct impact matrix:

$$\lambda = 1 / \max_{1\le i\le n} \sum_{j=1}^{n} z_{ij}, \mathrm{G} = \lambda \mathrm{Z} \tag{9}$$

Step 5: Based on $T = G + G^2 + \cdots G^n$ or $T = G(E-G)^{-1}$, the matrix T can be calculated.
Step 6: T can reflect the structure of revealed index system. The influence degree Di is obtained by summing the rows in T, and the influence degree RI is obtained by summing the columns in T:

$$Di = \sum_{j=1}^{n} t_{ij} (\mathrm{i} = 1,2,\cdots,n)\ (10)\ \ Ri = \sum_{i=1}^{n} t_{ij} (\mathrm{i} = 1,2,\cdots,n) \tag{11}$$

The centrality is obtained by adding the influence degree and the affected degree, which reflects the comprehensive importance of the index in the whole system. The formula is as follows:

$$m_{i} = D_{i} + R_{i} (\mathrm{i} = 1,2,\cdots,n) \tag{12}$$

$$\begin{aligned} n_{i} &= D_{i} - R_{i} (\mathrm{i} = 1,2,\cdots,n) \\ \mathrm{H} &= \mathrm{T}_{i} - R_{i} (\mathrm{i} = 1,2,\cdots,n) \end{aligned} \tag{13}$$

3.3 ISM

The research categorizes the structure of the system using ISM method (Beikkhakhian, 2015). The ISM method can decompose a complex system into subsystems and reveal the relationship between attributes more clearly and intuitively. Compared with the fuzzy DEMATEL method used to evaluate the complex interrelationships between factors at the micro level, the ISM method focuses more on the macro level. This paper uses ISM to divide the attribute system of the governance path for the dark side of the Internet based on users' negative psychology into 4 levels, illustrates the influence paths among different levels, and finally constructs a hierarchical governance framework. After calculating

the direct influence matrix Z, the matrix T is obtained by matrix Z. The calculation formula of the overall impact matrix is as following:

$$H=T+E=h_{ij};\lambda=\alpha+\beta \tag{14}$$

The α represents the average value of matrix T, and β represents the standard deviation of matrix T. Then, the reachability matrix is obtained by threshold.

$$M=[m_{ij}]_{n*n},(i=1,2....n;\ j=1,2....n) \tag{15}$$

$$m_{ij}=\begin{cases}1, h\geq\lambda\\0, h\leq\lambda\end{cases}(i=1,2....n;\ j=1,2....n) \tag{16}$$

Finally, according to the results of reachable set $L(f_i)$, antecedent set $P(f_i)$ and common set $C(f_i)=L(f_i)\cap P(f_i)$, the ISM is determined

4. RESULTS

Based on a review and analysis of the literature, this article summarizes 11 criteria of the negative impact of the Internet on user psychology. The proposed criteria are selected from the literature to ensure their effectiveness. Additionally, it is necessary to evaluate the rationality and standardization of the research through an expert committee.

As our criteria for the selection of experts, we took a rigorous and serious attitude and responsibly selected 7 Internet industry practitioners as experts. All of the experts selected have been engaged in Internet design, the software industry, or e-commerce platform operations for many years, with rich practical experience in Internet platform design, operation, supervision and other fields. They have been responsible for technology, management, and so on, and they have an in-depth understanding of all aspects of Internet platforms as well as rich domain knowledge and practical experience. Therefore, the experts participating in this study have a solid reserve of professional knowledge and abundant practical experience, which to a certain extent guarantees the scientificity and rationality of the research conclusions.

Before the assessment process, it needed to be proved by the committee that the attributes (including aspects and criteria) proposed in the study. As long as one expert disagrees with any of the proposed measures, the committee must discuss the measure until all experts reach a consensus. Data collection process is improved consistency through personal face-to-face interviews and prevent other experts' judgments from being affected. First, in terms of contact with experts, a face-to-face conversation should be used. With the consent of the experts, the purpose of this study and the time needed for further study were introduced in detail. Before completing the questionnaire, it was necessary to explain the background and purpose of the study to clarify that there was no conflict of interest in this study. Elaborating the actual meaning of the 11 criteria and each part of the questionnaire to be completed was also indispensable. Then, the experts completed the questionnaire on site, during which some necessary explanations were provided. Subsequently, their answers were corrected and summarized to obtain the fuzzy direct impact matrix. Then, based on the CFCS method, the original data were processed, and finally, the direct impact matrix of the factors of the dark side of the Internet that influence user psychology was obtained, as shown in Table 4.

Table 4. Direct influence matrix of the factors of the Internet that have a negative influence on user psychology

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
C1	0.0000	0.3961	0.5866	0.5173	0.5519	0.5173	0.4827	0.5000	0.2576	0.5346	0.2576
C2	0.3961	0.0000	0.5173	0.5866	0.5173	0.5519	0.2229	0.2749	0.5000	0.2749	0.4827
C3	0.2403	0.2229	0.0000	0.2229	0.5173	0.2576	0.4481	0.4827	0.2056	0.2403	0.5519
C4	0.2576	0.2403	0.2056	0.0000	0.0844	0.4134	0.4307	0.2229	0.4307	0.4827	0.2403
C5	0.1883	0.2229	0.5000	0.2056	0.0000	0.2576	0.4654	0.2229	0.2922	0.3095	0.5519
C6	0.2229	0.1710	0.2576	0.5000	0.3961	0.0000	0.2229	0.2229	0.2403	0.5693	0.3095
C7	0.1537	0.1710	0.2749	0.1883	0.2056	0.2229	0.0000	0.4827	0.5000	0.0152	0.0152
C8	0.1883	0.1710	0.1017	0.0498	0.2229	0.2056	0.2749	0.0000	0.2056	0.0152	0.0325
C9	0.1883	0.1537	0.0152	0.0498	0.0498	0.2576	0.2922	0.2922	0.0000	0.0152	0.0152
C10	0.0844	0.2056	0.1364	0.1537	0.2403	0.1364	0.2056	0.4481	0.5519	0.0000	0.5173
C11	0.0325	0.1364	0.2403	0.2056	0.2576	0.2056	0.2056	0.5519	0.3615	0.4481	0.0000

We normalize the direct influence matrix of the factors of the Internet that have a negative influence on user psychology to obtain the standardized direct influence matrix, and then, MATLAB is used to calculate the comprehensive influence matrix based on the following formula: $T=G(E-G)^{-1}$. The comprehensive influence matrix is shown in Table 5.

Table 5. Comprehensive influence matrix of the factors of the Internet that have a negative influence on user emotion

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
C1	0.1045	0.1868	0.2553	0.2330	0.2605	0.2512	0.2620	0.2849	0.2320	0.2483	0.2039
C2	0.1756	0.1046	0.2345	0.2412	0.2446	0.2524	0.2045	0.2315	0.2665	0.1971	0.2381
C3	0.1200	0.1223	0.1041	0.1367	0.2108	0.1583	0.2090	0.2338	0.1718	0.1499	0.2148
C4	0.1168	0.1176	0.1275	0.0863	0.1132	0.1782	0.1897	0.1677	0.2046	0.1863	0.1399
C5	0.1066	0.1186	0.1943	0.1298	0.1070	0.1533	0.2065	0.1807	0.1842	0.1592	0.2120
C6	0.1127	0.1087	0.1449	0.1861	0.1782	0.1027	0.1584	0.1734	0.1745	0.2130	0.1666
C7	0.0815	0.0851	0.1173	0.0965	0.1103	0.1161	0.0812	0.1809	0.1796	0.0638	0.0662
C8	0.0745	0.0721	0.0710	0.0570	0.0977	0.0943	0.1128	0.0651	0.1019	0.0505	0.0552
C9	0.0705	0.0642	0.0462	0.0520	0.0567	0.0986	0.1081	0.1141	0.0553	0.0442	0.0420
C10	0.0706	0.0977	0.0973	0.0955	0.1245	0.1067	0.1287	0.1917	0.2064	0.0729	0.1760
C11	0.0605	0.0842	0.1163	0.1046	0.1283	0.1180	0.1288	0.2099	0.1690	0.1590	0.0786

According to formulas (10)-(13), the influenced degree, influence degree, centrality degree and causality degree are calculated. Figure 2 is not only the DEMATEL causality diagram, but also a visual representation of the data in Table 5. Based on the centrality and causality, we can clearly discover the importance of different criteria and the specific influence relationships among them.

Regarding the influence degree, the sum of the rows in Table 5 indicates the extent to which other factors are affected. Regarding the influenced degree, the sum of the columns in Table 5 indicates

how much each factor is affected. Centrality represents a criterion's position in the system and the size of its effect. The causality degree reflects the causal relationship among criteria. If the causality degree is greater than 0, the criterion has a great influence on other criteria, which is called causality criterion. If the causality degree is less than 0, the criterion is mainly affected by other criteria, which is called result criterion.

Then, the 11 criteria are divided into a cause set and a result set based on the degree of cause, as shown in Table 6.

Figure 2. DEMATEL causal diagram

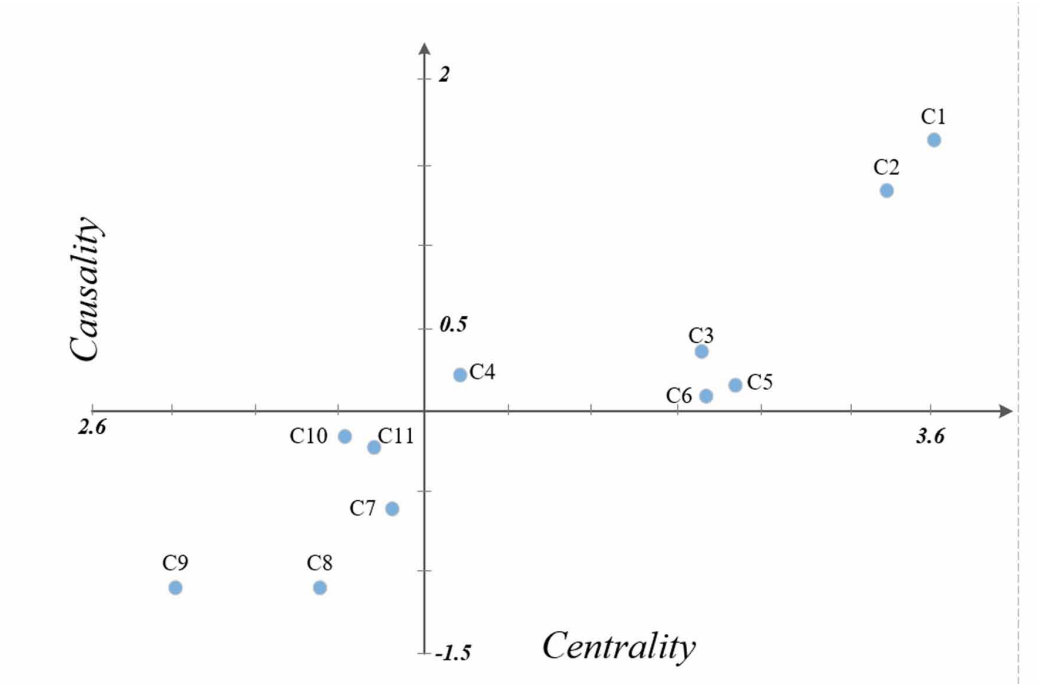


Table 6. Comprehensive impact matrix analysis

Factor	Influence degree	Influenced degree	Centrality degree	Causality degree
C1	2.5221	1.0937	3.6158	1.4285
C2	2.3905	1.1618	3.5524	1.2287
C3	1.8314	1.5086	3.3400	0.3228
C4	1.6278	1.4188	3.0466	0.2090
C5	1.7522	1.6317	3.3839	0.1206
C6	1.7191	1.6298	3.3489	0.0892
C7	1.1785	1.7897	2.9682	-0.6112
C8	0.8521	2.0336	2.8857	-1.1815
C9	0.7519	1.9458	2.6977	-1.1939
C10	1.3681	1.5441	2.9122	-0.1760
C11	1.3571	1.5933	2.9504	-0.2362

There are 6 reasons: regulatory system review (C1), refinement of the punishment system (C2), privacy protection (C3), authenticity of the information disseminated (C4), qualification standards for access (C5), and information disclosure (C6). Among them, C1 and C2 are the main motivations. The corresponding influence degrees of C1 and C2 are 2.5221 and 2.3905, respectively, and they are the two most influential factors among all of the factors, indicating that these two factors have the highest influence degree on all other factors. The reason is that the governance of the negative impact of Internet platforms cannot be separated from the formulation and implementation of relevant government institutional systems. Institutional factors greatly affect the operation and development of Internet platform enterprises, which in turn affect the emotion of users. The institutional level constitutes the causal level and has a significant effect on other factors. Special consideration should be given to the institutional level when managing the negative impact of Internet platforms. The other four elements in the cause set are C3, C4, C5, and C6, which mainly aim at the governance of the business ethics of Internet platforms. To manage the negative impact of Internet platforms, we must pay attention to the existence of operation platform problems, such as the lack of well-established qualification standards for access for food delivery platforms and travel platforms, the lack of authenticity and transparency of credit platform information, and the leakage of private information on social media platforms. These problems can lead to negative psychological problems, such as user anxiety and insecurity. Therefore, this type of factor is included in the cause set and has a certain impact on other factors.

There are 6 result elements, including education and training (C7), the avoidance of extremist psychology (C8), the avoidance of entertainment first (C9), process tracking technology (C10), and risk prevention technology (C11). These result elements have a weaker negative impact on user psychology but are more susceptible to other factors. Changes that occur due to impacts, mainly reflecting technology and personal values, such as extremism and an entertainment-oriented culture, will be significantly affected by business ethics and institutional-level factors, and the application of technologies such as risk prevention tracking is also closely related to the direction of platform operations. Such result elements are more affected and should be appropriately considered and controlled in actual management to help improve the effectiveness of management. Based on the degree of centrality, the factors are (in descending order) C1, C2, C5, C6, C3, C4, C7, C11, C10, C8, and C9. The overall influence matrix H obtained by formula (14) is shown in Table 7.

Table 7. Global impact matrix

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
C1	1.1045	0.1868	0.2553	0.2330	0.2605	0.2512	0.2620	0.2849	0.2320	0.2483	0.2039
C2	0.1756	1.1046	0.2345	0.2412	0.2446	0.2524	0.2045	0.2315	0.2665	0.1971	0.2381
C3	0.1200	0.1223	1.1041	0.1367	0.2108	0.1583	0.2090	0.2338	0.1718	0.1499	0.2148
C4	0.1168	0.1176	0.1275	1.0863	0.1132	0.1782	0.1897	0.1677	0.2046	0.1863	0.1399
C5	0.1066	0.1186	0.1943	0.1298	1.1070	0.1533	0.2065	0.1807	0.1842	0.1592	0.2120
C6	0.1127	0.1087	0.1449	0.1861	0.1782	1.1027	0.1584	0.1734	0.1745	0.2130	0.1666
C7	0.0815	0.0851	0.1173	0.0965	0.1103	0.1161	1.0812	0.1809	0.1796	0.0638	0.0662
C8	0.0745	0.0721	0.0710	0.0570	0.0977	0.0943	0.1128	1.0651	0.1019	0.0505	0.0552
C9	0.0705	0.0642	0.0462	0.0520	0.0567	0.0986	0.1081	0.1141	1.0553	0.0442	0.0420
C10	0.0706	0.0977	0.0973	0.0955	0.1245	0.1067	0.1287	0.1917	0.2064	1.0729	0.1760
C11	0.0605	0.0842	0.1163	0.1046	0.1283	0.1180	0.1288	0.2099	0.1690	0.1590	1.0786

Table 8 shows the results calculated based on formulas 15 and 16, which support the subsequent stratification. In Table 8, parameter λ was introduced as a threshold to determine whether there is an impact between two factors. A value higher than λ means that the row factors affect the column factors, while a value lower than λ means that the row factors do not affect the column factors.

Table 8. Reachability matrix

M	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
C1	1	0	1	1	1	1	1	1	1	1	0
C2	0	1	1	1	1	1	0	1	1	0	1
C3	0	0	1	0	1	0	1	1	0	0	1
C4	0	0	0	1	0	0	0	0	0	0	0
C5	0	0	0	0	1	0	1	0	0	0	1
C6	0	0	0	0	0	1	0	0	0	1	0
C7	0	0	0	0	0	0	1	0	0	0	0
C8	0	0	0	0	0	0	0	1	0	0	0
C9	0	0	0	0	0	0	0	0	1	0	0
C10	0	0	0	0	0	0	0	0	1	1	0
C11	0	0	0	0	0	0	0	1	0	0	1

The primary decomposition structure is obtained from the reachability matrix and formula (17), as shown in Table 9.

Table 9. Primary decomposition structure

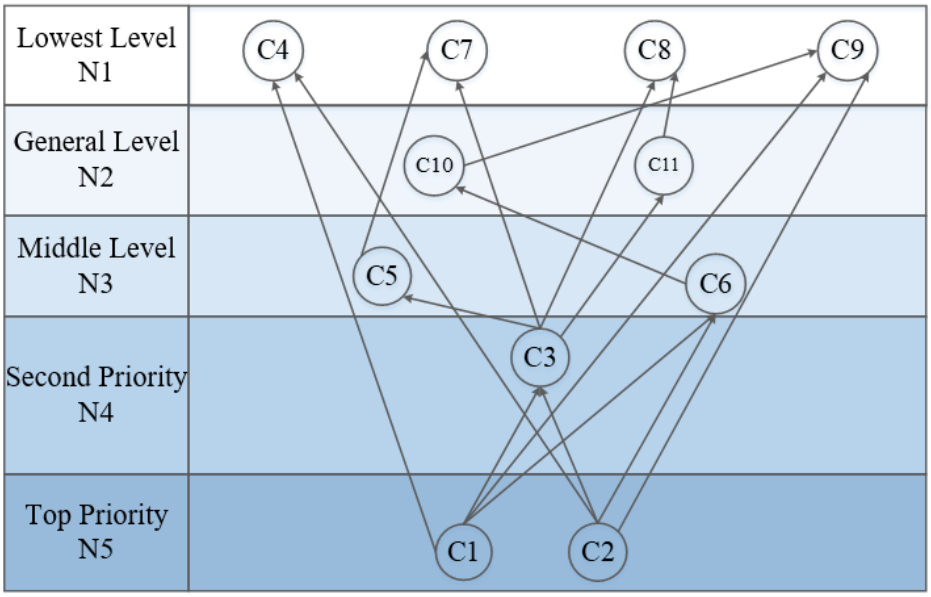
C1 Regulatory system review	1, 3, 4, 5, 6, 7, 8, 9, 10	1	1
C2 Refinement of the punishment system	2, 3, 4, 5, 6, 8, 9, 11	2	2
C3 Privacy protection	3, 5, 7, 8, 9, 10, 11	1, 2, 3	3
C4 Authenticity of the information disseminated	4, 6, 7, 8, 9, 10, 11	1, 2, 4	4
C5 Qualification standards for access	5, 7, 8, 9, 10, 11	1, 2, 3, 5	5
C6 Information disclosure	6, 7, 10, 11	1, 2, 4, 6	6
C7 Education and training	7	1, 2, 3, 4, 5, 6, 7, 10, 11	7
C8 Avoidance of extremist psychology	8	1, 2, 3, 4, 5, 8, 10, 11	8
C9 Avoidance of entertainment first	9	1, 2, 3, 4, 5, 9, 10, 11	9
C10 Process tracking technology	7, 8, 9, 10	1, 2, 3, 4, 5, 6, 10	10
C11 Risk prevention technology	7, 8, 9, 11	1, 2, 3, 4, 5, 6, 11	11

Note: *i* represents the number of criteria. $L(f)$ represents the factors affected by C_i. $P(f_i)$ represents the factors that affect C_i. $L(f_i) \cap P(f_i)$ represents intersection.

As shown in Table 9, the factors C4, C7, C8 and C9 constitute the first-level influencing factors, because of the reachable set and the common set intersect in here. Delete the rows and columns mapped by influencing factors C4, C7, C8, and C9 in matrix M to obtain a higher-level decomposition matrix, and repeat the above process. Finally, the factor set Nq (q = 1, 2, …, 5) of each layer is obtained after several layered partition: first-level node N1 = {4, 7, 8, 9}; second-level node N2 = {10, 11}; third-level node N3 = {5, 6}; fourth-level node N4 = {3}; and fifth-level node N5 = {1, 2}.

Based on the above analysis, an ISM model is shown in Figure 3.

Figure 3. ISM model structure



From the analysis of the influencing factors, the ISM model shows that C1, C2, and C3 are the root cause of the impact of the Internet on the negative psychology of Internet users. How to effectively track and control these factors is key.

In summary, the factors that affect the dark side of Internet platforms are very complex, and there are interactions between various levels: the institutional system, business ethics, technology, and personal values. However, different factors have different paths of influence, mechanisms and degrees of effect. This study forms a systematically integrated framework for the governance of the negative impact of Internet platforms on the psychology of Internet users, and it explores a scientific governance path to ensure the active, healthy, and secure operation and development of Internet platforms.

5. DISCUSSION

This study systematically proposes a set of criteria for how to address the negative psychological impact on users due to the dark side of the Internet and constructs a hierarchical framework. The data processing results can be summarized based on three aspects.

First, the institutional system is not only the basis of Internet governance but also the foundation of the whole model. It contains two influencing criteria, both of which belong to the reason set. The institutional criteria target most Internet platforms and products, and they widely exist in Internet development. In the face of chaotic Internet finance, for P2P lending platforms, the norms imposed by national laws and regulations are lacking, and there is relatively lax legal supervision (Xiao, 2015). Similarly, there are imperfections in the laws and regulations for advertising platforms (Estrada and Jim, 2019), live broadcasting platforms (Song, 2019) and online social network service platforms (Richelle, 2016). Because the institutional system places mandatory constraints on human behavior, it will affect the use and operation of platforms at the foundational level. The institutional system has a fundamental impact on the development of the Internet and affects users' psychology, emotions and behaviors. The scope of influence of the institutional criteria covers almost every level. The implication is that the imperfection of the institutional system has a strong influence on the development of the Internet, and attention should be paid to the governance of the institutional system. However, there are still gaps in the current construction of this system, which must be further refined and perfected. The specific implementation process can be managed in two ways: the regulatory system review in place and the refinement of the punishment system. In the past, many scholars have proposed similar suggestions. Chen pointed out that the imperfection of the legal supervisory system for social media will lead to differences in laws and regulations regarding whether a certain act violates privacy protections; thus, the privacy security of subjects cannot be effectively guaranteed. Taking Facebook as an example, Lipford (2016) elaborated the impact of deficiencies in the institutional system on privacy issues. Yaman (2019) proposed that there are many problems in online live broadcasting platforms; for example, the subject of supervision is diversified, the mechanism of regulatory content review is imperfect, the provisions regarding legal liability are unclear, and the mechanism of industry self-discipline is imperfect. Accordingly, this paper proposes more systematic and comprehensive criteria at the level of the institutional system. Compared with the unidimensional analysis of Internet platforms and products, this research is more systematic and is not limited to a certain field. Systematically analyzing the governance difficulties of P2P, advertising, live broadcasting, and other types of platforms and incorporating the research conclusions of previous scholars, this paper proposes that the institutional criteria include two aspects: the unification of the supervisory system and the refinement of the punishment system. At the same time, this paper focuses on the influence of institutional criteria on users' negative psychology. To a certain extent, it expands the boundary and enriches the application space of existing theory and helps to strengthen the governance of the dark side of the Internet based on its most basic level.

Second, the discussion of values constitutes a major breakthrough in this article. This paper analyzes the origin of various types of negative user psychology caused by the Internet, generalizes these types, summarizes the value issues behind negative psychology, and subdivides them into vulgar, spoof, extreme and entertainment. The existing literature has conducted research in terms of values to a certain extent, including the specific cognitive consciousness brought by the redundant information of social media, the shallowness of the information provided to users by live broadcast and news media platforms (Svenja, 2019) and the impact of online culture with increased participation on social media platforms (Desmond et al., 2013). Previous studies described only the relationship between a certain phenomenon and its impact (Kyunghee, 2019), or when analyzing the source of the phenomenon, the depth of research was at only the surface level (Nursen, 2011). In contrast, this paper integrates 12 types of negative user psychology caused by the use of the Internet and further analyzes the causes of negative psychology based on existing research, tracing the causes to the root values. By analyzing the results of the questionnaire, the cause and impact of each factor are obtained. Surprisingly, as the root motivation of various behaviors and types of psychology, "values" are not at the most basic causal level but at the N1 level, which means that the value criteria are most affected by other criteria. This result shows the position of values in the criteria of the Internet. Their role is to guide everyone through the external expression of the instructions issued by the implementation

of values, and they have a direct impact on individuals' psychology, emotions, and behaviors. The research in the article is also consistent with the existing literature. Establishing a positive-value orientation requires a long-term process. Changes in a short period of time are not realistic; thus, the leapfrogging of civilizations will always undergo a long evolution. This is by no means an overnight process.

Third, to discover a hierarchical framework for guiding the development of the Internet, the provision of specific paths to overcome the negative effect of the Internet on the psychology of users is an important innovation of this paper. This research finds that to effectively govern the negative influence of the Internet on users' psychology, we must start with the problems in the institutional system, then cross the barriers of technology and business ethics, and finally attend to the norms and governance of personal values. These four aspects affect and correlate with each other. Each factor has an influence on the psychology of users to different degrees, and the effects and paths of influence of each factor are different. Internet governance involves a wide range of issues. Therefore, it requires the participation of the government, technical personnel, platform managers and users. In this regard, the problem of an imperfect institutional system is the fundamental issue in Internet governance, and this system combines both technology and business ethics. When combined with technology, a model proposed by Klein and Rosenberg (1986) is still considered to be the clearest description of the technology innovation process. According to their model of technology innovation, the success or failure of a technological innovation is the result of multiple attributes. Technological improvement must be driven by the institutional system. Imperfect technology will cause special problems in the use and operation of the Internet, which will have a negative impact on users' psychology. At the same time, issues in business ethics are also constrained by the institutional system, and the external institutional environment has a significant role in promoting corporate social responsibility (Yu, 2014). Increasingly, more people are driven by self-interests to exploit legal loopholes. Avoiding ethical anomie has become a serious challenge. A benefit-oriented operational philosophy will harm users, not only in terms of benefits but also in terms of their psychology. Only under the guidance of the institutional system, which will strictly regulate rewards and punishments, can problems of business ethics be effectively solved. Finally, after crossing the barriers of technology and business ethics, it is also necessary to standardize the personal values of Internet users. The formation of personal values that are closely related to mental health is related to many factors, such as the external environment of an evolving culture; thus, it is very difficult to manage. We should start from the foundation to establish and improve users' cognition of normal behavior to avoid the generation of harmful ideas.

6. CONCLUSION

Previous studies have explored the impact of environment, organization, psychology, technology and other contingency variables on the effectiveness of Internet management (Gallupe and Tan, 1999). This kind of research has paid attention to that the internet can bring some negative emotions when helping users finish their work faster, such as depression, loneliness and distraction, security and privacy issues (Cheung and Lee., 2001; Issa et al., 2019), but with the effectiveness of Internet management as the main purpose, most of these research focus on how to improve the efficiency of Internet operation, ignoring the dark side of Internet development. In particular, there is a lack of research on Internet governance from the perspective of users' negative psychology. This research not only summarizes 12 types of negative psychology of Internet users and explores the causes of negative psychology but also constructs a governance framework for the dark side of the Internet. Based on a full consideration of the interaction of criteria at different levels of governance, our research discovers a hierarchical framework for guiding the development of the Internet, offering specific paths to overcome its negative effect on the psychology of users. This framework enables people to guide the development of the Internet in a positive direction, and it provides a systematic path for assessing the reasons for the negative impact of current developments on user psychology.

The comprehensive application of fuzzy set theory, the DEMATEL and ISM not only screens out unnecessary attributes but also manages the complex interrelationships among the aspects and criteria, importantly facilitating the realization of the research in this paper.

The governance framework for the dark side of the Internet side based on users' negative psychology is composed of four levels: the institutional system, ethics, technology and personal values. Therefore, targeted governance should be carried out based on the different positions of different levels in practice. In terms of the institutional system level, a relatively perfect supervisory and review system should be established by the government and relevant departments. The business ethics and technology level should be improved by Internet platform enterprises to enhance ethical concepts and improve hardware technology. Regarding the level of personal values, users must pay attention to the formation and cultivation of their own values when using the Internet. The results of this research not only supplement the existing literature in theory, but also promote the development of global Internet information management system and the improvement of governance system in practice.

This study has several limitations. First of all, although the criteria proposed in this paper are selected on the basis of extensive literature review, they are still insufficient to cover all possible criteria. Second, the questionnaire used in this study to adopt multiattribute decision-making contained a large number of items. Each expert took, on average, 45 minutes or more to complete the questionnaire, which may have affected the patience of the experts and the consistency of the questionnaire to a certain extent. Although fuzzy set theory was proposed in this study to deal with the subjective bias of experts, there were still some problems that were difficult to eliminate completely, which may have had a certain influence on the results of the research. Meanwhile, the scope of application of the attributes remains to be seen. In the future, more comprehensive measures should be considered and more comprehensive discussions should be conducted with experts. Therefore, future work can focus on how to avoid and solve these problems and explore more effective solutions to the negative impact of the Internet on the psychology of users as a way of extending the existing hierarchical framework. Finally, the data of this paper are mainly from China. It is helpful to improve the integrity of the global Internet governance system by incorporating the research results into the global information management. Even under the cultural background of different countries, there are still some negative problems in the development of Internet (Niederman et al., 2012). Therefore, future research can be based on different cultural heterogeneity and cultural diversity, exploring a more perfect and diversified governance framework for the dark side of Internet from the perspective of users' negative psychology.

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