

# *Application Value and Governance of eHealth Technology*

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**Abstract:** In response to the growing prevalence of chronic non-communicable diseases, an eHealth technology system based on electronic technology has been developed. As a technical means to address the spread of chronic diseases, eHealth technology plays a significant role in health risk assessment, prevention, and health promotion, garnering active attention. Reflecting on the application process and outcomes reveals that the integration of technology and health is not a simple linear process of modern technology spreading into the health field, but a dynamic and complex nonlinear process. This process demonstrates the co-evolution of technology and human activities and the electronicization of health. However, the excessive focus of eHealth technology on material aspects of human beings has led to issues such as the dislocation of subject identity, structural deficiencies in care dimensions, the generalization and capitalization of technology application. To promote the service of electronic technology for overall health, based on the exploration of the intrinsic logic of health ecosystems and governance, governance solutions are proposed. These include restoring the humanistic value of eHealth technology, optimizing the eHealth technology system, reasonably limiting the application of eHealth technology, and constructing a human-capital collaborative value system. These measures aim to build a positive correlation development model between eHealth technology and the health value of individuals.

## 1. The Electronic Technological Shift in Health Governance

The fundamental need to effectively govern health through the continuous tracking of dynamic behaviors and disease states, and the acquisition of health state information has objectively spurred the broader and deeper application of electronic technology, resulting in a new technological system - eHealth technology.

### 1.1. Connotation of eHealth Technology

Scholars have conducted comprehensive and in-depth research on the phenomenon of eHealth technology from different research directions and perspectives. However, as with most emerging

phenomena, eHealth technology is still in a state of continuous development and change, and individual's understanding of eHealth technology is also evolving.

In the 1990s, with the development of the internet, individual's lifestyles and work methods changed significantly, which also had an important impact on the medical and health fields. Gunther Eysenbach, the editor-in-chief of the *Journal of Medical Internet Research*, was one of the first to focus on eHealth issues, describing eHealth as a concept and a new way of healthy living. eHealth technology includes not only data transmission between patients and healthcare providers, institution-to-institution data transmission, and interactions between patients or between healthcare professionals, but also health information networks, eHealth records, telemedicine services, and personal wearable and portable communication systems for patient monitoring and support[1]. It provides technical assurance for both healthcare services and health management systems, ultimately achieving the goal of health governance. Gee and colleagues define eHealth from the perspective of chronic disease self-management as the application of information and communication technology (ICT) in chronic disease management, using feedback data and information generated by ICT to improve patient health outcomes. Domestic scholar Han Xu defines eHealth as a collective term for tools based on ICT that help and enhance prevention, diagnosis, treatment, monitoring, and management in the realm of health and lifestyle. The World Health Organization (WHO) defines eHealth technology as the use of ICT to deliver healthcare services, manage health systems, and improve communication quality. Thus, eHealth encompasses interactions between patients and healthcare providers, institution-to-institution data transmission, and interactions between patients or healthcare professionals, as well as health information networks, eHealth records, telemedicine services, and personal wearable and portable communication systems.

Based on this understanding, eHealth technology has developed into a new technological system through the comprehensive application of information technology, communication technology, big data technology, AI technology, and telemedicine technology, forming a new social domain. eHealth can be defined as a new healthcare model that integrates modern medical technology and ICT to meet the growing public health needs, improve human health levels, and enhance the efficiency of healthcare. It effectively utilizes and integrates various health resources, including information and funds, and establishes the corresponding infrastructure. Through the interaction and collaboration of policymakers, healthcare users, healthcare institutions, and health service providers, it achieves comprehensive health services from prevention, diagnosis, treatment, and health monitoring to management and healthcare.

## 1.2. Development of eHealth Technology for Governance

Since the 1950s, the global spread of chronic diseases has become a fundamental challenge to human health development. After the limited success of exploring disease treatment methods, attention shifted to behavioral interventions, promoting the transition from a biomedical model of health intervention to a socio-biomedical model.

This transition brought about a revolution. Traditional technological methods for behavior-based health governance entered a dilemma, with widespread issues such as the inability to share health records, regional gaps in medical resources, difficulties in health monitoring, challenges in obtaining behavioral data, and difficulties in analyzing vast amounts of data. These issues objectively spurred technological innovation activities in this field, driving the construction of a high-speed information and technological system. The aim was to break down traditional technological barriers and build a compatible, comprehensive, content-rich, timely, efficient, and resource-sharing eHealth technology system through the high integration of advanced technologies such as cloud computing, the internet, and big data with modern medical and preventive healthcare systems[2].

Newly developed eHealth technology is primarily applied in several key areas: (1) eHealth Records, which collect and organize electronic information related to individual health activities; (2) Telemedicine, utilizing computer technology, remote sensing, and holographic imaging to bridge gaps in medical conditions and technologies, achieving seamless distance healthcare; (3) Wearable Devices, connecting wearable devices with mobile applications through cloud interaction and data exchange to provide personalized data and software services; (4) Mobile Communication Devices, primarily referring to health-related applications in mobile phones that effectively guide and assist in health training and disease intervention; (5) Health Information Collection and Management, organizing, analyzing, and processing health information collected from electronic devices; (6) Behavioral Data Analysis and Guidance. Research indicates that eHealth technology applications have led to seven research hotspots: telemedicine, eHealth records, health information service tools, user health informatics, eHealth literacy, mobile health, and user health behavior changes [3].

Objectively speaking, in the field of eHealth technology, health serves as the prerequisite for the existence and development of electronic technologies. Health provides goals and guidelines for innovation and application in electronic technologies. Electronic technologies, in turn, are effective tools for health governance, establishing a set of technical rules to guide health management. This involves regulating daily behaviors based on vast data generated from complex behaviors and lifestyles. Popular examples such as Huawei Health, fitness apps, Xinglin Doctor, as well as wearable devices like Huawei and Xiaomi smart bands, and Apple and Huami smartwatches, operate within people's daily lives rather than strictly within the medical domain. Through these electronic devices and service systems, individuals collect and analyze data on their own states such as physical activity, sleep patterns, blood oxygen saturation, heart rate, and electrocardiograms, thereby monitoring and managing their health status. Therefore, eHealth technology is not just a technology but also represents a new digital lifestyle—a digitally enhanced approach to health governance.

## **2. Reflection on the Application of eHealth Technology**

With the widespread adoption of eHealth technology, individual's reliance on eHealth has gradually deepened, gradually forming a typical "human-machine-environment" health governance system, leading to significant changes in the roles and status of technology and humans. On the one hand, the autonomy of technology is increasingly prominent, and the data obtained by technology on health status becomes the basis for human activities. On the other hand, individuals' intuition, emotions, imagination, and experiential judgments are gradually alienated, and their initiative, autonomy, and liveliness become increasingly unreliable, leading to the "dehumanization" of humans within the eHealth technology system.

### **2.1. Dislocation between Individuals and eHealth Technology**

Whether traditional health technologies or modern eHealth technologies, their fundamental purpose is to achieve individual's health goals through technological means. In other words, the value of eHealth technology should be reflected in whether it plays an affirmative role in achieving human health, with human values determining the direction of technological value. However, in the integration process of eHealth technology and human behavior, there still exists a phenomenon of "dehumanization" [4]. Despite scholars proposing to strengthen consumer empowerment in the application of eHealth technology and improve the rationality of eHealth technology applications, in real life, the fundamental process of eHealth technology gradually assuming a dominant position remains unstoppable.

eHealth technology has transitioned from a simple health governance tool and means, from a state of obedience to guiding, dominating, and regulating human values, gradually shifting towards guiding

and regulating human behavior. It has not only become the fundamental basis for human behavior but has also undergone comprehensive transformation of human subjects, becoming a force that controls human thoughts and actions, thereby causing a dislocation in the relationship between humans and eHealth technology. Firstly, eHealth technology misguides individuals' perception of health. Despite different eHealth technologies having varying health assessment mechanisms, their collective impact leads individuals to increasingly lack subjective judgment, resulting in a distinct phenomenon of "depersonalization"[5]. Due to significant differences among individuals, it is challenging to use a uniform standard for the standardized evaluation of individuals' disease states or health statuses. Consequently, the trend towards the standardization and authority of evaluation processes, content, and mechanisms, heavily reliant on eHealth technology, becomes more pronounced. After being detached from their self-perceptions, individuals rely solely on "technological objective assessments," raising doubts about whether achieving an objective state solely through these assessments is feasible. Nevertheless, in reality, individual's increasing distrust of their own perceptions makes phenomena such as trust, reliance, and even superstition in technology more prominent, inevitably intensifying the technological transition towards deeper fields and levels of development.

Secondly, individuals have insufficient dual cognition of the value of technology, meaning technology can be beneficial or harmful[6]. Throughout human social development, technology has always appeared in a guise of effectiveness. By gradually solving various difficulties encountered in individual's lives and production, technology has become the embodiment of the "correct" solution, forming a trusted and convincing authority, gradually leading individual to idolize or blindly worship technology. Because individuals primarily emphasize the positive value of technology, they often subjectively overlook its negative value. Thus, as eHealth technology advances, individual's blind trust in technology strengthens, potentially exacerbating phenomena of evaluation bias caused by structural deficiencies in health assessment, and reinforcing the negative value of technology. After health big data generated by eHealth technology itself becomes a meaningful and valuable objective entity, individuals gradually lack reasonable judgment regarding the objectivity and utility of technological outcomes. As a result, on one hand, individuals increasingly distrust their own perceptions of health, severely undermining the rationality of the concepts, methods, and means of health governance. On the other hand, technological data becomes an objectively meaningful entity, gaining the right to reasonably transform individuals.

Finally, after eHealth technology becomes commercialized, it transforms into a commodity. Generally, the use value of a commodity is based on the relationship between human needs and the attributes of the object. Therefore, as a commodity, the value of eHealth technology inevitably manifests in the relationship pattern between individuals and technology. This compels the enhancement of technological commodity attributes, ensuring the comprehensive realization of technological value through increasingly reinforced technological interaction with individuals' autonomy and authority. Clearly, this contradicts the premise that technology serves humanity. As eHealth technology develops and improves, the status of human subjectivity is increasingly threatened and challenged. It can be said that the alienating force exhibited by eHealth technology vividly illustrates the dominance of technology over humanity.

## **2.2. Structural Deficiency of eHealth Technology**

Modern health ontology encompasses multiple dimensions, integrating the complexities of the body, mind, social, and moral aspects. The conception of health corresponds directly to one's understanding and ontology of health. Health is a science, technology, and art concerning human life; its carriers are diverse individuals with varying life experiences and perceptions, thereby imbued with the warmth and tension of humanity itself. Assessing an individual's health status cannot rely solely

on single-dimensional indicators; it requires exploration across multiple dimensions: physical, psychological, social, and moral. A lack of any dimension may compromise the integrity of health assessment, resulting in outcomes lacking objectivity or even harmful to individuals' life statuses.

However, in real-life applications, eHealth technology used for health measurement and evaluation reveals significant structural dimension deficiencies.

On one hand, eHealth technology predominantly measures and evaluates health based on physiological data, while acquiring non-physiological data such as psychological or social adaptation remains a challenging issue. In other words, the absence of psychological and social adaptation data inherently leads to structural deficiencies in health data. Measurement and acquisition based on this incomplete structure inevitably generate inadequacies. Utilizing a unified standard for technically rational measurements of the diverse humanistic attributes is itself a challenge. Moreover, technical rationality often obscures the unique humanistic attributes possessed by individuals. As a tool or skill, technology can influence and alter human beings, yet describing or depicting changes in human perception, emotions, etc., over changing times and spaces remains difficult. Therefore, technologically induced structural deficiencies hinder accurate health assessment.

On the other hand, even measurements and acquisitions of physiological data exhibit structural deficiencies. This is primarily manifested in several aspects: Firstly, in terms of electronic product design, influenced primarily by manufacturers' profit interests, numerous products struggle to establish a standardized and uniformly regulated measurement system. Consequently, there exists an objective barrier to interoperability among devices, necessitating comprehensive technological reforms of eHealth systems for data collection. Secondly, in health assessments, problems often arise due to limited data dimensions and linear data support, leading to inaccuracies in assessing health conditions, especially disease states, and making misjudgments likely. Thirdly, the interrelationships between data are difficult to clearly depict and explain. Single-dimensional measurements struggle to establish logical relationship models that allow for mutual reactions among different datasets. This complicates comprehensive positioning and analysis of health or disease states through correlation analysis. Fourthly, the detachment from individual subjectivity deprives the eHealth technology system of a core value dimension—the self-judgment dimension of the individual.

The operation of eHealth technology systems with structural deficiencies often struggles to address or identify the unique, non-quantifiable, and individualized characteristics of individual. Generally, technological measurements are based on a mechanistic view of the body, achieved by reducing the complexity of the body to fit the technical characteristics. For instance, while the internal organs form a systemic whole, the current eHealth technology system lacks comprehensive measurement capabilities for the entire system. Instead, it evaluates the basic states of organs—whether healthy, diseased, or normal—through isolated measurements of the heart, liver, kidneys, etc. This reductionist approach disrupts the systemic integrity of the human body.

### 2.3. The Generalization of eHealth Technology

To understand the generalization of eHealth technology, we must first clarify its rational properties. eHealth technology embodies a form of technical rationality, which is a specialized type of practical rationality. Technical rationality does not merely pursue means or ends; rather, it integrates social desirability, scientific rationality, and natural necessity into the effectiveness of the means. It seeks efficiency while encompassing purpose, material means while engaging with knowledge reserves, and is rooted in nature while addressing societal needs. It embodies natural necessity while achieving subjective goals and pursues ideals while being mindful of conditions and adept at compromise[7]. The instrumentalization of technical rationality, known as instrumental rationality, involves utilizing external expectations and the behaviors of others as “chains” and “means” to achieve rationally



considered goals[8]. The generalization of eHealth technology essentially stems from the prominence of instrumental rationality and the decline of value rationality.

Instrumental rationality focuses on the functionality of tools and optimal results, a mode of thought that emphasizes the final outcome. In contrast, value rationality is unrelated to results; it emphasizes personal “rules” and “requirements,” involving aesthetics, religion, duty, and human dignity. It considers the rational meaning of human existence and ultimate concerns for humanity. eHealth technology must account for both instrumental and value rationalities because health-related technologies encompass both instrumental value and ethical responsibility.

eHealth technology represents the fusion of health concepts with modern science and technology, leading to the instrumentalization of rationality. The growing demand for health management has spurred the rapid development and application of eHealth technology, outpacing its value rationality, thereby causing its generalization. This generalization manifests in four main aspects: Firstly, eHealth technology has become the “correct technology” for health governance, widely used in disease diagnosis and health assessment, serving as the sole standard for determining health. Secondly, eHealth technology has become the “definitive technology” for health governance, broadly applied in health interventions across different populations, acting as a guide and norm for individual’s actions. Thirdly, eHealth technology has become the “reliable technology” for health governance, extending into the depths of individual’s thoughts and forming the basis for their thought processes. Finally, eHealth technology has become the “feasible technology” for health governance, integrating with people’s behaviors and becoming another dimension of human actions.

### **3. Governance of eHealth Technology**

Modern medical systems, to a certain extent, have regimented and standardized health, making the human body a controlled object. Besides treating physiological ailments, modern medicine also manages the human body by shaping “normal” bodily standards and behavioral norms through various methods, thereby regulating people’s daily behaviors and lifestyles. Additionally, due to the dual nature of eHealth technology, it generates significant societal benefits while also harboring substantial risks. Therefore, comprehensive governance measures are needed, including value reconstruction, setting reasonable limits, optimizing technical systems, and fostering individual awareness.

#### **3.1. Promoting the Humanistic Return of eHealth Technology**

Reestablishing the value demands of individuals and actively promoting the value reconstruction of eHealth technology to facilitate its return to humanistic nature is a primary concern. As a technological artifact with intentionality and autonomy, eHealth technology requires the establishment of a value system that places humanistic needs at its core existence and development. By integrating humanistic attributes such as value presuppositions and ethical judgments into the technological design process, eHealth technology can shift its focus gradually from technical utility to concerns for human health and vibrant humanistic subjectivity. In a sense, prioritizing ethical and moral judgments in the technological development process constructs governance strategies that achieve responsible control beyond technical considerations from a socioconstructivist perspective.

Promoting the return of eHealth technology to its humanistic roots also involves drawing nourishment from traditional Chinese health governance. Unlike Western perspectives, Chinese health views embody an ecosystemic perspective. Besides considering the impacts of physical and mental dimensions on health, it emphasizes harmonious coexistence between humans and the environment, highlighting prominent humanistic qualities in health. Concepts such as unity of heaven and humanity and coordinated harmony between humans and nature form the value framework of

traditional Chinese health governance[9]. Moreover, Chinese health governance represents a humanistic governance model characterized by “virtues, nurturing health through morality, and promoting goodness”. Finally, traditional Chinese medicine advocates proactive health maintenance through concepts like “preventing disease before it occurs,” which not only shapes attitudes and methods towards illness but also embodies a proactive system for health preservation. Therefore, integrating the humanistic care inherent in traditional Chinese health maintenance and governance concepts into modern health governance systems undoubtedly represents a unique contribution.

### **3.2. Optimizing the eHealth Technology System**

Given the reality that the development of eHealth technology has traditionally focused excessively on physiological data, resulting in structural deficiencies, it is imperative to consider and explore the optimization of the eHealth technology system. This is essential to meet the basic societal demands for comprehensive health governance. Optimizing the eHealth technology system entails several key aspects: Firstly, from a functional perspective, it is crucial to construct multidimensional technical functionalities that cater to optimal states of physiological health, psychological well-being, and social adaptability. This approach aims to avoid structural deficiencies caused by an overemphasis on physiological issues. Secondly, it involves constructing an eHealth technology system based on complex multidimensional relationships involving human behavior, human-environment interactions, and beyond. This system utilizes technologies such as big data, AI, edge computing, and mobile internet to process vast amounts of complex data intelligently. This enables the interpretation of subtle changes in life states and potential negative trends, thereby preventing misjudgments and misunderstandings of health due to simplistic linear data relationships. Lastly, it requires establishing the legitimate logic of human attributes such as vitality and complexity within the eHealth technology system. This is achieved by defining the value goals of human health development, promoting the return of technological values to the fundamental path of human development, optimizing the relationship patterns between technology and individuals, and creating a situation where technology fully serves the proactive health actions of individuals.

Furthermore, eHealth technology should restore autonomy and freedom to individuals, placing human dignity and freedom at the core, thereby granting individuals more autonomy and freedom of choice. It emphasizes respecting the value and diversity of individuals, allowing individuals the right to decide how their health data is used and shared, as well as the extent of their participation in medical decisions. Technology should provide individuals with more information and tools to actively participate in health management and decision-making processes. Optimized technology demonstrates greater humanistic care, enhancing interactions and emotional connections between technology and people, as well as between individuals.

### **3.3. Setting Reasonable Limits for the Application of eHealth Technology**

As a result of the autonomous nature of modern eHealth technology, there has been a rapid expansion trend. Therefore, setting limits for eHealth technology is a necessary means to promote more rational application and development of the technology. This requires promoting the unity of purpose and value rationality in the application of this technology. Firstly, health governance issues are not merely medical or technical issues, nor are they solely biomedical issues; they are more about ethical, moral, and value judgments in life governance. Therefore, the primary challenge for eHealth technology is to address how to make reasonable judgments and improvements based on individual values. In other words, prioritizing the values of individuals in health governance should be a primary principle, ensuring the enhancement of social and natural values under natural and social environmental conditions, improvements in behaviors, lifestyles, and psychological changes, rather

than solely focusing on physiological data. This approach aims to achieve the goal of applying eHealth technology with unified value rationality. Secondly, there is a need to reconstruct a health concept based on a systemic view and develop a governance system that fully integrates with eHealth technology. This involves liberating health governance from the traditional linear thinking modes of disease treatment and prevention. It explores organismal evolution processes and rules from a biomedical perspective, analyzing the profound impacts of relevant factors on health. Moreover, it adopts a social governance perspective to construct a socio-biomedical model based on moving the health gateways forward, comprising a set of value concepts, discourse systems, and practical activities consisting of “health socialization” and “social healthization.” This ensures that technological development returns to a rational trajectory[10].

### **3.4. Constructing a Human-Capital Synergistic Value System**

Currently, the intervention of social capital in the development of the eHealth technology system has led to serious negative value phenomena—where the profit-seeking nature of capital gradually erodes the intrinsic value of individuals. In other words, due to capital’s intervention, eHealth technology has experienced significant alienation, resulting in serious social issues such as distorted health cognition, worship of electronic technologies, and blind pursuit of excessive governance, thereby reducing individuals to mere appendages of technology. Objectively, the expansion of capital in the field of eHealth technology often starts with the premise of erasing basic human attributes such as subjective feelings, vitality, and complexity. It supports the construction of a persuasive, worship-worthy, objective, and image-filled technological system to gain control over the value of individuals. In essence, the technological authority established by capital leads to the comprehensive decline of human-centric values.

To change this situation, it is necessary to fully activate human attributes such as autonomy, vitality, and complexity within the eHealth technology system. Despite strong technological interventions and inducements, individuals should still maintain their role as vibrant subjects capable of feeling and value judgment, even if these judgments may entail risks of misjudgment. Enhancing the leading role of human-centric values first requires dismantling the authority of eHealth technology, raising individuals’ self-awareness, establishing correct health concepts, comprehensively assessing the current state of technological development, and fostering awareness of technological risk control. This ensures that individuals’ value judgments and behavioral patterns become the prerequisite conditions for the existence, development, and continuous optimization of technology. In other words, on the one hand, eHealth technology needs to be premised on the thoughts and behaviors of individuals, and on the other hand, the thoughts and actions of individuals need to be premised on the enhancement of health values. Only through setting limits on technology and individuals can we break free from the situation where capital’s profit-seeking leads to the comprehensive domination of technological authority. Moreover, this approach prevents technological indicators from becoming the sole criteria for evaluating individual health, as noted by American philosopher of technology Langdon Winner—technology fundamentally reshapes people’s lifestyles, social roles, and relationships, not only altering daily life but also influencing values, perceptions, understanding, and thereby changing people’s ideologies and modes of thinking[11].

## **4. Conclusion**

The escalating global health crisis compels people to seek technological assistance, hoping to use electronic technologies to alleviate worsening health threats. On the one hand, this has spurred the rapid development of eHealth technology and to some extent addressed issues such as objective judgment, reasonable prevention, and effective treatment of diseases. However, the generalization of



eHealth technology has made the data it provides the fundamental basis for people's health judgments, thereby turning technology into a "scaffold." Returning to the fundamental attributes of individuals and constructing a rich and diverse humanistic world requires people to reconstruct their inherent abilities for autonomous judgment and their goals of value. This not only allows technology to return to humanistic principles but also restores health to its essence, thereby providing the impetus for constructing a better world.

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