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Opportunities, Challenges and Countermeasures for Women's Development in the Age of Artificial Intelligence From the Perspective of Rights Protection

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Abstract. The right to development is an inherent part of human rights. As the institutional expression of the principle of gender equality in the field of development, women's right to development derives its legitimacy from the human dignity in natural law, the normative confirmation in positive law and the pursuit of substantive justice in social law. From the perspective of rights protection, this paper explores the realization of women's right to development in the age of artificial intelligence, pointing out that the right to development is the core human rights support for women's all-round and free development. At the same time, artificial intelligence technology has brought multiple opportunities for women's development: it has eliminated the physical prerequisites of the traditional gender division of labor, expanded the space for women's employment and entrepreneurship in the economic field, lowered the threshold for participation in the field of social participation, and further promoted the in-depth improvement of women's right to cultural expression in the cultural field. However, technology is not value-neutral. Artificial intelligence embedded with patriarchal prejudices and capital logic has also exposed women to new rights crises such as structural employment inequality, the solidification of gender images by algorithmic discipline, and the erosion of subjectivity by technological abuse. The causes stem from the digital reproduction of the patriarchal social structure, the influence of commercial capital, and the digital suppression of women's professional self-efficacy. In response, this paper proposes approaches such as innovating employment forms, improving institutional guarantees, and enhancing women's voice in artificial intelligence governance, aiming to protect women's right to development and promote gender equality and the progress of social civilization.

Keywords: Women, Right to development, Human rights, Artificial intelligence

1. Introduction

With the continuous development of artificial intelligence, intelligent technology has achieved a leaping breakthrough from perceptual intelligence to cognitive intelligence. Its scale of development has deeply penetrated into all fields of social life such as employment and production, education and medical care, public governance, and cultural communication, and has become the core force

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reshaping the form of human civilization to this day. "Human beings have no innate essence; human essence is shaped through repeated free choices in the process of their existence." [1] In the intelligent age, while science and technology have brought numerous dividends and opportunities to the work and life of human society, the new problems and risks they have triggered, such as the digital divide, gender discrimination, privacy risks and occupational displacement, have also aroused the alert and concern of all sectors of society. Human rights are the fundamental and indispensable rights that make humans human. In essence, the primary meaning of human rights is the specific form of existence of "dignified survival and development". The right to development is an inherent part of human rights: it is the core path for humans to move from "survival" to "species-being", a practical process for the evolution from "abstract human beings" to "concrete human beings", a modern transformation to achieve the unity of individual perfection and social progress, and an inevitability for society to move towards "truth, goodness and beauty". To protect and realize the right to development, "every human being and all peoples are entitled to participate in, promote and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms are fully realized." [2] As a vulnerable group, how women can make good use of science and technology in the age of artificial intelligence, promote the progress of artificial intelligence towards gender inclusiveness and equality from the perspective of protecting women's rights, enjoy the opportunities created by artificial intelligence, and at the same time advance the high-quality development of women and overcome the challenges such as algorithm discrimination and the digital divide caused by artificial intelligence technology have become an inevitable issue that must be addressed at present.

2. Raising of the question

Women's development is a core criterion for measuring the progress of social civilization, and the right to development, as an inalienable basic human right, is the core support for women to achieve all-round and free development. The United Nations Declaration on the Right to Development of 1986 clearly states that the right to development is the basic right of every human being to participate in, promote and enjoy economic, social, cultural and political development. The realization of women's right to development is essentially a historical process in which women shake off gender oppression, obtain equal development opportunities, share the fruits of development, and realize the construction of their own subjectivity. 2025 marks the 30th anniversary of the adoption of the Beijing Declaration and Platform for Action at the World Conference on Women. President Xi Jinping emphasized at the opening ceremony of the Global Summit of Women that "Women are important creators, promoters and inheritors of human civilization, and advancing the cause of women is a common cause of all mankind." [3] This important exposition not only highlights the global value of women's development, but also anchors the core direction for the legal protection of women's right to development. Throughout history, there can be no social progress and perfection without the development and progress of women. As an important part of social development, women are an important force participating in national construction.

"With the accelerating pace of the development of digital industrialization and industrial digitalization in China, the digital economy has become an important engine for advancing Chinese modernization and a vital driving force for China's economic growth." [4] In the age of artificial intelligence, the interaction between technology and gender presents unprecedented complexity. On the one hand, the automation and intelligence characteristics of artificial intelligence have eliminated the physical prerequisites of the traditional gender division of labor based on manual labor, providing a brand-new technical path for women to participate in social production on an

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equal footing, obtain inclusive education, and expand their discourse space, demonstrating great potential to promote women's liberation in development. On the other hand, technology has never been a value-neutral tool, but a carrier and reproduction mechanism of specific social power structures. Existing studies have shown that artificial intelligence technology is embedded with deep-rooted patriarchal prejudices and capital logic in the entire chain of research and development, design and application. It not only amplifies the gender inequality in traditional society, but also gives rise to new rights crises such as hidden discrimination under the algorithmic black box, objectifying discipline in the digital space, and the marginalization of voice in technological governance, thus exposing women's right to development to the risk of technological alienation.

The legitimacy of women's right to development stems from the concept of human dignity in natural law, the basic normative confirmation in positive law and the pursuit of substantive justice in social law. From the first cry for gender equality in Olympe de Gouges' Declaration of the Rights of Woman and of the Female Citizen in 1791 to the global signing of the Convention on the Elimination of All Forms of Discrimination against Women in 1979, gender equality has risen from a moral appeal to a legal principle. As stated in the United Nations Human Development Report, "It has long been assumed that the overall development of society and the individual development of social members are always a relationship where prosperity for all follows, and in this process, the impact of gender is neutral." [5] Moreover, this assumption of neutrality has a profound restrictive effect on the free and all-round development of all mankind, and it is a traditional cognitive misunderstanding of the relationship between development and gender impact. The United Nations Millennium Development Goals Report 2015 further emphasizes that "The process of social progress has always neglected women, as well as groups that are at the bottom or in a disadvantaged position economically due to age, ethnicity, disability and other reasons." [6] Faced with freedom and development based on contract theory, the concept of the individual is often extremely abstracted into a so-called absolute value; atomic individuals are equally empowered and naturally have priority, while the state is often passively placed in opposition to active individuals. This concept of the passive state is a kind of "social Darwinism" infiltration. In terms of the realization of the right to development, the sovereign state is the primary responsible subject for protecting the right to development. While creating conditions for the development of individuals and collectives, it must also assume the responsibility of safeguarding social justice. Since the world history entered the 21st century, with the rapid development of economy, society and culture, women's liberation has made significant progress, but at the same time, the issue of women's full development has gradually become prominent. How to use limited development resources to enable women and men to have equal development rights is not only a key issue that the women's group itself needs to pay attention to, but also an issue that the development of all mankind needs to focus on.

3. Opportunities for women's development in the age of artificial intelligence

"The all-round development of women emphasizes the continuous improvement and optimization of social reality conditions to provide a more ideal and inclusive realistic environment for women, in which women can obtain full satisfaction at all levels based on their own internal needs, including but not limited to physiological needs, safety needs, belonging and love needs, as well as esteem needs and self-actualization needs." [7] Marxism holds that technology is the objectification of human essential power and the material force for humans to transform nature and realize their own liberation. In essence, technological development is a historical process in which humans constantly break away from the constraints of nature and expand their own freedom, and technological progress is of fundamental significance for women's liberation.

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3.1. Breaking traditional barriers in the economic field and expanding the space for income increase and entrepreneurship

Employment is the foundation of people's livelihood, the core support for people to settle down and get on with their lives, and the basic premise and necessary path for individuals to shake off survival difficulties, realize value promotion, and demonstrate social subjectivity. The right to employment is a basic personal and social right, which is clearly defined as a basic right equally enjoyed by men and women in international conventions such as the Universal Declaration of Human Rights and the Convention on the Elimination of All Forms of Discrimination against Women. Its core essence lies in "non-discrimination" and "equal opportunity", thus rejecting any discriminatory treatment based on unreasonable factors such as gender, race and skin color. For women, the realization of the right to employment is by no means simply obtaining a job, but an important cornerstone for them to shake off economic dependence, realize personality independence and confirm their own subjectivity. Economic independence endows women with the material basis for independently choosing their lifestyle and controlling their own development destiny. The value creation and social participation in the employment process can break the family subsidiary positioning constructed by the traditional patriarchy, allowing women to truly integrate into the process of social development as equal subjects and demonstrate their abilities and values. This is also a concrete embodiment of the core connotation of the Marxist theory of women's liberation that the key to women's liberation lies in achieving economic independence. Under the background of the increasingly prominent trend of global economic integration, the rapid iteration of science and technology has reshaped the global industrial pattern and labor forms, leading to the increasingly frequent cross-border flow of goods and capital. Cutting-edge technologies such as artificial intelligence, autonomous driving, 5G communication and blockchain have become the iconic forces leading the wave of the Fourth Industrial Revolution. At the same time, the in-depth development of cutting-edge technologies has also promoted the in-depth transformation of labor production methods from "manual labor-dominated" to "intellectual labor-dominated", from "fixed employment" to "flexible employment", and from "single skill" to "comprehensive quality". This profound change in labor forms has objectively expanded the space and created favorable conditions for women's employment and development. Moreover, the weakening of manual labor brought about by the continuous development of cutting-edge technologies has further broken the natural physical advantages of men in the traditional employment field, allowing women to give full play to their unique advantages such as carefulness, patience and communication and coordination in the fields of digital economy, modern service industry and cultural and creative industries, thus helping to promote the emergence and development of new employment models such as telecommuting, flexible employment and platform employment. This provides the possibility for women to balance family and career and realize flexible employment, and also creates opportunities for women to break through the traditional occupational boundaries and improve their occupational level.

3.2. Lowering the threshold of social participation and improving the effectiveness of women's public participation

Development is the fundamental premise for meeting women's needs for a better life, and also the core path to crack the alienated existence of women and realize the return of subjectivity. Its philosophical foundation is deeply rooted in Kant's value assertion that "Human beings are ends in themselves, not means to an end", manifested in the core connotation of "subjective rights" in the philosophy of rights, and essentially an ontological right for women as independent subjects to

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pursue self-shaping, self-transcendence and self-actualization. Different from other rights guaranteed by state coercive power with distinct attributes of passive empowerment, the promotion and implementation of women's right to development largely depend on the actual contributions made by women in the process of social development. Of course, such contributions are by no means simply "labor output", but a philosophical process in which women confirm their own essential power, break the gender hierarchical order and reconstruct the equal gender relationship through practical activities. In practice, women's labor and value creation not only provide corresponding material support and social recognition for the realization of their own right to development, but also further promote the cognitive innovation of human beings on "gender equality", eliminate the one-sided misunderstanding of metaphysical "gender essentialism", confirm the profound assertion of Marxism that labor creates human beings themselves, and demonstrate the essential power of women as social subjects. "The rapid development of artificial intelligence technology has not only greatly improved production efficiency, but also released more free time for people, thus enabling individuals to have more opportunities to pursue self-development and realize personal potential, promoting the overall well-being and progress of human society, driving the prosperity of social economy, and thus bringing substantial wealth accumulation and growth to society." [8] By empowering digital government affairs, platforms for expressing public opinions and other fields, artificial intelligence has lowered the threshold of women's social participation, broken the temporal and spatial constraints of traditional social participation, and provided new channels for women to participate in public decision-making on an equal footing. In practice, women can conveniently express their own interests and demands, participate in the discussion and decision-making of public affairs through online public opinion collection, online political consultation, digital petition and other ways, and enhance their voice in public governance. At the same time, big data technology can more accurately identify women's demand for public services, promote the formulation of public policies with a more gender perspective, make up for the gender blindness in traditional public policies, and provide a more comprehensive technical support for women to equally enjoy public services and participate in public governance.

3.3. Empowering the development of a better life and further promoting the right to cultural expression

Engels pointed out in Dialectics of Nature that "Once production exists, the so-called struggle for existence is no longer merely for means of subsistence, but for means of enjoyment and means of development." [9] In the current era of rapid scientific and technological development, the application of artificial intelligence has played an important role in meeting women's needs at all levels, and its influence is reflected in all aspects of daily life, promoting the further satisfaction of multi-level and diversified needs. According to Maslow's Hierarchy of Needs, the need for self-actualization is an inevitable product of the pursuit of a higher level of life after people meet their basic survival needs. It is not only the essential pursuit of human all-round development, but also an important embodiment of social progress and development. As the core carrier of contemporary technological civilization, artificial intelligence deconstructs the traditional structural barriers with technological rationality and reconstructs the gender development order with digital inclusiveness, injecting core driving force with the characteristics of the times into the in-depth realization of women's right to cultural development, and promoting women's development from formal equality to substantive equality, and from passive acceptance to active construction. The right to cultural expression is the spiritual core of women's right to social and cultural development, and the full development of the right to expression is related to the construction of women's discourse

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subjectivity and cultural identity. In terms of the development history of media, the traditional media ecology has long been attached to the discourse system dominated by men, and the female images it shapes are often single, stereotyped and dependent. In essence, it is the oppression and discipline of women's subjectivity by patriarchal culture, and a concentrated embodiment of the marginalization of women's discourse power and the narrowing of cultural expression. However, the new media platforms empowered by artificial intelligence, with their decentralized communication logic and diversified creative carriers, have completely broken the monopoly pattern of the traditional discourse hegemony and opened up a brand-new cultural field for women to speak independently, express themselves and shape themselves consciously. Digital forms such as short videos, live streaming and AI content creation have transformed women from "cultural audiences" to "cultural producers", and from "the object of gaze" to "the subject of self-definition". Women tell their life experiences, express their rights and demands, and show diverse styles through digital media, which is not only a deconstruction and subversion of the traditional stereotyped female images, but also an affirmation and promotion of the diverse life values of women. The all-round improvement of this right to cultural expression is by no means a simple iteration of media forms, but a profound revolution of women's awakening of self-awareness, demonstration of subjective spirit and reconstruction of cultural identity. It is a key leap for gender equality to extend from the material level to the spiritual level and penetrate from the social field to the cultural field, confirming the profound philosophy that cultural rights are basic human rights and the pluralistic coexistence of gender culture is an important symbol of the progress of human civilization.

4. Challenges and causes for women's development in the age of artificial intelligence

General Secretary Xi Jinping emphasized that "Today, we are faced with more arduous tasks and more ambitious goals, and we need the wisdom and strength of women even more." At present, with the transformation and development of productive forces, especially in the deepening of social practice, the comprehensive realization of women's right to development is facing more complex difficulties. These difficulties are not simply institutional defects or backward concepts, but the realistic embodiment of deep-seated philosophical and human rights legal contradictions. Analyzing the essence of these difficulties from the perspective of philosophy and law and exploring the ways to solve them is not only a deepening of the theory of women's right to development, but also an inevitable requirement for promoting the free and all-round development of human beings and advancing the progress of social civilization. In reality, the women's group is increasingly reluctant to use the general expression of "women's issues" to summarize the various difficulties they encounter in participating in social construction and their own development process, and instead tend to accurately point out the explicit or implicit gender inequality in development. Because these issues essentially involve multiple dimensions such as social structure and cultural concepts, and cannot be covered by a single "women's issues".

4.1. Challenges for women's development in the age of artificial intelligence

1. Structural employment inequality. While empowering development, artificial intelligence technology embedded with the patriarchal power structure and capital logic has also given rise to a series of new rights dilemmas, exposing women's right to development to the crisis of alienation and erosion in multiple dimensions such as economy, social culture, human dignity and governance participation. Marcuse pointed out that "The rationality of science and technology and manipulation are merged into a new form of social control." [10] New dilemmas such as the digital divide, skill

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barriers and algorithm discrimination are intertwined with traditional employment discrimination, further exacerbating the inequality of women's employment, making women face a complex situation of both opportunities and risks, both advantages and difficulties when taking the fast train of technological innovation. In reality, many women are still limited to the occupational categories with low income, low added value and low technical content. In the employment access link, algorithm recruitment systems automatically replicate the gender prejudices in the traditional employment market through learning historical recruitment data, forming a systematic exclusion of women in the name of "objective and efficient" technology. In the scandal of Amazon's AI recruitment system exposed in 2018, the system learned from resume data over the past 10 years and found that most resumes in the technology industry came from men, so it automatically filtered out resumes containing key words such as "female", and finally the system was abandoned due to serious gender discrimination. In addition, when the main working fields of women are impacted by artificial intelligence technology, factors such as occupational gender segregation and the traditional social expectations of women's roles may also become obstacles to their career transfer and re-employment. Coupled with the conflict between family responsibilities and career development, their career transfer space in the labor market is also limited. This not only increases the risk of female unemployment, but also restricts the diversity and development space of their career paths [11] . As a relevant assertion points out, "Employment gender discrimination is a common discriminatory phenomenon worldwide. It is the most common type of discrimination generally listed and prohibited by international conventions." [12] How to take advantage of the situation to fully release the development dividends brought by technological innovation, effectively avoid the potential risks in the development process, and solve the dilemma of gender inequality in the employment field has become an important issue that the women's group needs to address in their own development process, and also an important practical proposition for promoting social fairness and justice, realizing the all-round development of women and practicing the concept of substantive rule of law.

2. Discourse discipline and image solidification under algorithmic bias. "With the continuous development of Internet technology, the symbolic meaning of images conveyed by film and television dramas, advertisements, magazines and other media is often immeasurable." [13] The gender binary opposition cognition accumulated for a long time in the patriarchal society is encoded into the implicit algorithm preferences and screening rules in the age of artificial intelligence, thus forming the digital replication and strengthening of traditional gender prejudices. Algorithms push content such as beauty, parenting, housework and emotions to female users, and push content such as science and technology, finance, politics and sports to male users. The reason for this is not a spontaneous choice of technology, but the extension and solidification of the traditional gender power structure in the digital field. The so-called algorithmic discipline disguised as "personalized services" imprisons women within the framework of traditional gender roles of "gentle, family-oriented and appearance-focused" by means of pervasive content push. It not only solidifies the social cognition of gender binary, but also internalizes into a kind of women's self-identity, thus restricting their occupational choices, value pursuits and development boundaries. From the perspective of the right to development, this process deprives women of the subjective right to define themselves independently and break through gender shackles, reducing women's right to development from the ultimate goal of human all-round development to a digital reproduction of traditional gender roles, thus producing a substantive restraint under the cover of formal equality.

3. Erosion of subjectivity by the abuse of artificial intelligence technology. Human dignity is the essential stipulation of women as "complete human beings" and the core foundation for the

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demonstration of their subjectivity and autonomy. The rapid development of artificial intelligence technology should have become a tool to empower women's development and protect women's rights and interests. However, under technological alienation, patriarchal logic and capital profit-seeking, it has become an invisible blade eroding women's right to human dignity. Its infringement from the right to portrait, the right to privacy, the right to reputation to the right to bodily autonomy is not simply a technological anomie, but a refined extension and digital reproduction of the traditional gender power structure in the digital age, and in essence a systematic erosion of women's subjectivity and a fundamental departure from women's personality independence.

In the application of artificial intelligence technology, deepfake technology is used to symbolize and simulate women's biometric features such as portraits and voices, transforming biometric features, which are the core elements of human dignity, into computable, reproducible and tamperable binary digital codes, thus reducing women to a unit of digital symbols that can be arbitrarily forged and disposed of. Statistical data from Dutch security agencies point out that more than 90% of the victims of deepfake pornographic videos worldwide are women, and neither public figures nor ordinary women can escape this indiscriminate technological infringement. Lawbreakers use deepfake technology to splice women's portraits into pornographic content and spread it widely. In essence, this is a kind of "objectification" and "instrumentalization" of women's bodies and personalities, an extreme interpretation of Beauvoir's The Second Sex theory that women are shaped as the "Other" to satisfy men's visual desire. Such infringement is not an isolated individual injury, but a systematic gender oppression. The low threshold and high dissemination of deepfake technology expose women's personality rights to all-weather and all-round threats, forming a kind of gender-based violence in the digital space, which in turn triggers tragedies such as cyber violence, workplace discrimination, family breakdown and even suicide of victims, pushing women into a survival dilemma of being gazed at, slandered and harmed.

4.2. Analysis of the causes of the challenges faced by women's development in the age of artificial intelligence

1. The influence of traditional patriarchal society and commercial capital on women's subjectivity. "Women's right to development" is different from "the right to development of women": the latter is only a superficial definition and partial interpretation of the former, while the former is essentially an institutional expression of the principle of gender equality in the field of development, a comprehensive right to protect women's access to equal development opportunities, improve their capability and realize personality independence by eliminating gendered structural oppression. It has the dual attributes of both civil liberties and social rights, individual rights and collective rights. Based on this exposition and spirit, Marx and Engels clearly realized that merely focusing on the women's group itself is not enough to achieve the fundamental goal of their free and all-round development as human beings. To enable women to fully demonstrate their key role in the evolution of human civilization, it is necessary to deeply explore the deep-seated root causes of women's long-term oppressed status, which is an important starting point for Marx and Engels to elaborate on the theory of women's liberation. Based on this, first of all, from an objective perspective, Marx and Engels believed that women's suffering from systematic oppression has its specific social and historical inevitability, which is deeply related to the development stage of human productive forces and the evolution track of the marriage system. Throughout history, women have not been in a predicament of oppression from the very beginning, but their status has changed with the changes of the marriage system. Historically, the changes in women's status have experienced from group marriage in the age of savagery to pairing marriage in the age of barbarism, and it was not until the

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mature monogamy that gave birth to the so-called age of civilization that women completely fell into a state of oppression. In this process, the gender relationship has also experienced a long evolution from equal coexistence to unequal opposition. It is worth noting that the development of productive forces has a profound impact here: on the one hand, the rapid development of productive forces directly leads to the imbalance of gender relations in social production; on the other hand, the continuous deepening of the development stage of productive forces in turn provides a driving force for the equalization of gender relations. As Engels said, "The position of women, the position of all women, will also undergo a great transformation." [14]

In fact, such inequality is not an accidental social phenomenon, but an inevitable result of the alienation of the gender hierarchical order under the dual action of historical accumulation and social reality factors, and there are profound legal contradictions and value dislocations behind it. Under the hidden erosion of the patriarchal culture of thousands of years of feudal society, women's development has always been placed in a subordinate position in the overall social development. This subordinate relationship is essentially the erosion of women's subjectivity by the "androcentrism" value order and the negation of women's human nature. In the context of traditional patriarchy, women are abstracted as "appendages of the family" and "dependents of men" and suffer multiple oppressions from male power and social structure. Such oppression is not only manifested in external rights deprivation and unequal opportunities, but also penetrates into the spiritual level more seriously, thus leading to the alienation of women's subjectivity and the concealment of self-awareness, placing women in a natural disadvantaged position in social and economic development and seriously hindering the exercise of their legitimate development rights, thus causing women to fall into a dilemma of alienated existence of "being without subjectivity".

2. Digital reproduction of the patriarchal social structure. The fundamental social root of the dilemma of women's right to development in the age of artificial intelligence is the digital reproduction of the patriarchal social structure. The core of patriarchy is that the male-dominated gender power structure divides the public sphere and the private sphere into two parts, thus confining women to housework and care work in the private sphere and making them dependent on men, so that they cannot participate in social public life on an equal footing and realize their all-round development. Although the age of artificial intelligence has broken the temporal and spatial boundaries between the public sphere and the private sphere at the technical level, it has not fundamentally broken the core structure of patriarchy. On the contrary, it has reconstructed the binary opposition between the public sphere and the private sphere by means of technology, resulting in the digital reproduction of gender inequality.

In the age of artificial intelligence, algorithms squeeze women into the fields of care work and emotional labor through the solidification of occupational stratification. At the same time, the replacement of standardized labor by artificial intelligence makes non-standardized care work and emotional labor become fields that are difficult to be automated. The patriarchal society defines such labor as "women's nature" and leaves it to women. The feminist theory of social reproduction points out that housework and care work are the core links of the reproduction of labor power and the necessary premise of capital accumulation, but they have always been excluded from the value system of the public sphere, without being paid or covered by social security. In the age of artificial intelligence, this gender division of care labor has not been eliminated, but has been strengthened by technology. Women still undertake the vast majority of unpaid housework and low-paid care work, and are still confined to the role of labor power reproduction. In this process, women cannot truly participate in social production in the public sphere on an equal footing and thus realize their all-round development.

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3. Digital suppression of women's professional self-efficacy. Bandura's Self-Efficacy Theory holds that an individual's occupational choice, occupational effort and occupational achievement largely depend on their professional self-efficacy, that is, the degree of confidence an individual has in their ability to complete a certain occupational goal and be competent for a certain occupational position. Patriarchal gender stereotypes have long suppressed women's professional self-efficacy, and the age of artificial intelligence has further amplified this suppression effect through digital media and algorithm technology, making many women set limits on themselves and give up the pursuit of high-achievement occupations before entering the workplace. This is the deep psychological mechanism of women's structural employment inequality. Women's professional self-efficacy has been affected by gender stereotypes since childhood. Families, schools and social media constantly convey the idea that "girls are not suitable for science and engineering, technology and leadership positions", leading to girls' self-efficacy in science, technology, engineering and mathematics (STEM) fields being much lower than that of boys. Even if girls' academic performance in science and engineering is equal to or even better than that of boys, they will still think that their science and engineering abilities are not as good as boys. This phenomenon is known as "stereotype threat". Stereotype threat refers to the anxiety that individuals experience because they are worried about conforming to the negative stereotypes of their group. Such anxiety will lead to a decline in individuals' performance, and at the same time make individuals actively avoid relevant fields to avoid the negative impact of stereotypes. On the other hand, the serious lack of female role models in the field of artificial intelligence further suppresses women's professional self-efficacy. Whether in the content presentation of digital media or the actual situation of the artificial intelligence industry, the proportion of female technical experts, female managers and female entrepreneurs is extremely low. Women lack sufficient role models and peers in the field of artificial intelligence, making it difficult to form group identity and support. Social Identity Theory holds that an individual's self-identity largely comes from the identity of the group to which they belong. If an individual cannot see successful role models of the same group in a certain field, they will think that they do not belong to this field, it is difficult to generate identity with this field, and it is also difficult to form self-efficacy for development in this field. Many girls find that there are almost only men around them when studying computer majors and entering the technical industry, think that they do not belong to this field and finally take the initiative to give up, which is also an important reason for the extremely high female attrition rate in the field of artificial intelligence.

5. Possible paths to promote the realization of women's development rights in the age of artificial intelligence

5.1. Innovate employment forms and give play to gender advantages

Women's economic dependence is by no means simply material scarcity. Its deep essence is the alienation of women's subjectivity and the concealment of their human nature, as well as the double shackles of traditional production relations and gender hierarchical order on women. From the perspective of dialectical materialism, the economic base determines the superstructure. Women's subordinate status is essentially a concrete projection of economic dependence in the social and spiritual and cultural levels. Only by realizing women's economic independence can we break this alienated dependent relationship and promote the return of women from "objectified existence" to "subjective existence". This is not only the fundamental path for women to break away from the subordinate status and realize self-liberation, but also the core premise for women to confirm their own essential power and demonstrate their human value. Economic independence is not only the

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core symbol of independent women since the 21st century, but also the inevitable trend of women's development in the new era. Its legal connotation lies in that women control their own material and spiritual production through their own labor practice, thus shaking off dependence on external forces and realizing the full exertion of subjectivity and the complete realization of self-value. From the perspective of the Marxist theory of productive forces and production relations, the liberation and development of productive forces is an important prerequisite for women to realize liberation and development, which by no means can be simply attributed to "productive force determinism". The progress and development of women have always been closely linked to the level of development of productive forces in real society. The improvement of productive forces can not only provide women with a broader labor space and more abundant development opportunities, but also eliminate the constraints of traditional manual labor on women and break the shackles of gender division of labor; on the contrary, the liberation and development of women can also release women's subjective power, inject new vitality into the development of productive forces, and form a dialectical symbiotic relationship of "the development of productive forces empowers women's liberation, and women's liberation promotes the progress of productive forces". From the philosophical perspective of social practice, every leap in the level of productive forces is inevitably accompanied by the expansion of women's development space, which is a vivid proof of the progress of human civilization and the continuous demonstration of human subjectivity.

At present, live webcasting has broken through the traditional communication boundaries and developed into a new dual-driven digital economic model of "online drainage + physical consumption". Its vigorous development is essentially an inevitable product of the development of productive forces into the digital age, and a concrete embodiment of the transformation of labor forms from "manual labor-dominated" to "intellectual labor-dominated" and from "fixed employment" to "flexible practice". "Live webcasting has developed into a new digital economic model of 'online drainage + physical consumption', showing a vigorous development trend. Live-streaming e-commerce has become a popular shopping form among the majority of users. Data shows that 66.2% of female live-streaming e-commerce users have purchased goods in live broadcast rooms." [15] Behind this data is not only the transformation of consumption patterns, but also a profound embodiment of the awakening of women's consumption subjectivity and the externalization of value demands. The release of women's consumption demand is by no means a simple material consumption behavior. Its deep reason is women's pursuit of a better life and a demonstration of self-value. This demand has strongly promoted the development of industries closely related to the improvement of quality of life such as beauty and clothing. At the same time, women's strong consumption capacity is essentially the material externalization of women's subjective power and the embodiment of women's subjectivity as social subjects in economic development.

The state should encourage women to participate in the upsurge of employment and entrepreneurship in the service industry and emerging industries. This is by no means a simple employment orientation, but a practical path to promote women to realize the return of subjectivity, crack the dilemma of alienation and confirm their own value based on the theory of human liberation and the theory of productive forces development. At present, the service industry has broad development prospects. With the increasingly diversified service content, the steady improvement of service quality and the continuous deepening of the degree of enterprise operation, this industry contains huge development potential and has become an important pillar supporting the development of emerging industries. Marx once pointed out that "Men must first of all eat, drink, have shelter and clothing before they can engage in politics, science, art, religion and so on." [16]

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Moreover, compared with men, women often have broader development opportunities in the service industry. Such advantages are not simply differences in "gender characteristics", but a dialectical result of the high compatibility between women's subjective characteristics such as carefulness, patience and communication and coordination and the "people-oriented" industry spirit of the service industry. In addition, women's characteristics related to "being economical" are essentially concrete embodiments of women's practical reason and a profound understanding of labor value and rational allocation of resources, which have inestimable value in the link of enterprise cost control. As for cost control itself, it is also one of the core issues of enterprise management and a specific implementation of the pursuit of "unity of efficiency and value" in labor practice. Encouraging women to participate in employment in emerging industries can not only effectively alleviate social employment pressure and enrich the supply types of market products, but more importantly, enable women to give full play to their subjective abilities in the practice of emerging industries, realize the unity of labor value and self-value, and thus promote the economic independence and autonomy of the women's group. Such economic independence will be transformed into women's spiritual independence and personality independence, and ultimately promote women to completely break the alienated dependent relationship, confirm their own human nature and realize the free and all-round development of human beings. At the same time, it will inject lasting female power into the further liberation and development of productive forces, thus further highlighting the ultimate legal value of gender equality and social civilization progress.

5.2. Improve institutional guarantees and realize the return of subjectivity

Creating a sound policy environment for women's development is a necessary prerequisite for promoting the progress of the cause of women, and also a full practice and concrete embodiment of Institutionalism Theory and the Theory of Rule of Law and Human Rights Protection in the gender field. From the perspective of institutionalism, as a core supply of formal institutions, the integrity, scientificity and adaptability of the policy environment directly determine the space for women's development and the effectiveness of rights protection. A sound policy environment can further crack the institutional obstacles in women's development through clear institutional norms, rational resource allocation and effective incentives and constraints, guide social resources to tilt towards women and the majority of special groups, thus safeguarding and realizing social distributive justice. A sound legal environment is a solid defense for promoting the effective implementation of policies and the rigid protection of women's rights and interests. As one of the core subjects of human rights, the realization of women's legitimate rights and interests cannot be separated from the coercive constraints and normative guidance of the rule of law. Only by incorporating the protection of women's rights and interests into the track of the rule of law, and through improving legislation, strengthening law enforcement and judicial relief, can we build a strong defense for protecting women's rights and interests.

At the same time, positive policy advocacy is also an important support for building women's free development, which is highly consistent with the core view of "multi-stakeholder collaboration and value guidance" in social governance. Through policy advocacy, the state can not only convey the value concept of gender equality, eliminate the inertial thinking of traditional gender stereotypes, but also guide all sectors of society to form a strong consensus on respecting women and supporting women's development, and promote the formation of a governance pattern for women's development featuring "government leadership, social coordination and universal participation". At present, in response to the relevant practical problems faced by women in the process of development, we need to further improve relevant policies on employment, childbirth, anti-domestic violence and so on.

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Through the precise adaptation of policy supply to women's development needs, we can further highlight the responsiveness and pertinence of policies. At the same time, the optimization of policies must keep up with the pace of the times and closely meet the real life needs of women. Faced with new situations and new problems such as the protection of women's rights and interests in new forms of employment, birth cost sharing and the governance of new forms of domestic violence, only by breaking through the limitations of traditional policies and realizing the iterative upgrading of policy content and the innovative optimization of policy means can policies truly respond to the pain points and difficulties of women's development, effectively play the protective role of policies, and thus escort the all-round development of women. As a key human resource, women not only play an indispensable role in the construction of material civilization and spiritual civilization, but also exert an unparalleled influence in the inheritance and promotion of human civilization. In essence, the coordinated progress of women's development and social and economic development is an important criterion for measuring the level of social development. Women's active participation in the construction of various fields such as social politics, economy and culture is not only an internal demand for realizing their own development, but also an inevitable requirement for promoting the overall progress of society. As a relevant exposition emphasizes, "It is necessary to enhance women's ability to participate in political and economic activities, raise the level of women's participation in decision-making and management, and make women become leaders in the political, business and academic circles." [17] With the continuous emergence of outstanding female representatives in various fields, the "half the sky" value demonstrated by women in diverse social roles is becoming increasingly prominent, which is not only a vivid proof of the improvement of the level of women's development, but also an important symbol of the progress of social civilization. In this regard, the government should actively guide women to display their talents and take the initiative to participate in the construction practice of various undertakings, and in this process, break the hidden discrimination barriers against women in various industries and create a high-quality policy and social environment. Only by breaking hidden discrimination can women's potential be fully released, women's labor value be fully recognized, the coordinated progress of women's development and social and economic development be truly realized, the cause of women be advanced continuously, and the theoretical and practical significance of gender equality and social civilization progress be highlighted.

5.3. Optimize governance and enhance women's voice in artificial intelligence governance

The core of realizing women's right to development is to establish women's subjective status in the development of AI technology, enhance women's voice in AI governance, and enable women to participate equally in the entire process of AI technology research and development, design, rule-making, supervision and governance, so as to protect women's rights and interests from the source. First of all, it is necessary to promote women's equal participation in the research and development and design of AI technology and enhance women's representativeness in the technical field. Special policies should be formulated to encourage women to enter high-end fields such as AI research and development, algorithm design and technical management. Female scholarships and special training programs should be set up in AI-related majors in universities to increase the enrollment rate of women in AI-related majors. Mandatory gender ratio requirements should be set in enterprise AI R&D teams and technical standard-setting institutions to ensure that women can participate in the research and development and design of AI technology on an equal footing and eliminate gender prejudices from the technical source. At the same time, it is necessary to establish a mandatory gender impact assessment mechanism for algorithm decision-making to eliminate gender blindness

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in algorithm decision-making. Mandatory gender impact assessments must be carried out on algorithm decision-making systems in the fields of public policy, public services, judicial adjudication and social welfare distribution. Independent third-party institutions and women's rights organizations should participate in the assessment together to identify and correct gender prejudices in algorithms, ensure that algorithm decision-making will not cause unfair impacts on women, and protect women's right to equally enjoy public services. It is necessary to ensure that women's interests and demands can be fully heard and responded to, and break the power monopoly of "men leading technology and men making rules". As the core force reshaping the form of human civilization, the complex interaction between artificial intelligence and gender has brought brand-new opportunities and in-depth challenges for the realization of women's right to development. While eliminating the shackles of traditional gender division of labor and empowering women's economic development and cultural expression, technology has also given rise to new gender inequality issues such as algorithm discrimination and the erosion of subjectivity due to the embedding of patriarchal prejudices and capital logic. This also confirms that the protection of women's right to development has never been a simple technical issue, but a systematic proposition intertwined with multiple dimensions such as social structure, cultural concepts and technological governance. As the core human rights support for women to realize all-round and free development, the key to protecting the right to development lies in breaking the gender shackles at both the technical and social levels and enabling women to truly become participants, builders and beneficiaries of the development of artificial intelligence. From innovating employment forms to giving play to women's subjective advantages, to improving institutional guarantees to build a solid defense for rights, and then to enhancing women's voice in artificial intelligence governance and eliminating gender prejudices from the technical source, the exploration of multiple paths is essentially to promote the return of women from "objectified existence" to "subjective existence" and realize gender equality from form to substance.

6. Conclusion

The in-depth evolution of artificial intelligence technology has reshaped the underlying logic of social production and life, and also laid out a brand-new era prospect for the realization of women's right to development. Women's development is a core criterion for measuring the progress of social civilization. The development of the cause of women in the age of artificial intelligence not only requires the state to strengthen the protection of the right to development by taking the rule of law and policies as the starting point, but also requires society to eliminate gender stereotypes and promote the development of technology for good, and more importantly, requires the awakening of women's own subjective consciousness and the improvement of their abilities. Only through multi-stakeholder collaboration and a combination of measures can we fully release the gender dividends of artificial intelligence technology, solve the realistic dilemma of women's development, truly realize the comprehensive protection of women's right to development, and enable women to fully demonstrate the value and strength of "half the sky" in the age of artificial intelligence. This is not only the protection of women's basic human rights, but also an inevitable requirement for promoting the symbiotic development of technology and society, realizing the free and all-round development of human beings, and advancing social fairness and justice and the progress of human civilization.

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