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"Self as enterprise": overmarketization and the self-management of R&D engineers

Xia Yan*

*Correspondence:
yanxiasoci@163.com;
yanx58@mail.sysu.edu.cn
The Department of Sociology and Social Work, Sun Yat-Sen University, Haizhu District, No. 135, Xingang Xi Road, Guangzhou 510275, People's Republic of China

Abstract

This article analyzes the self-enterprising mechanism of research & development (R&D) engineers based on a case study of labor control in a high-tech company. The concept of "self as enterprise" refers to the form of labor control by allowing workers to self-manage according to the market principle. It is neither a form of normative control built upon accepting and internalizing market-oriented values nor responsible autonomy aiming to enhance workers' organizational commitment. R&D engineers' reproduction of current living standards depends heavily on performance-based salaries, which forces them to pragmatically comply with market rules. When both the reproduction of labor and the labor market have been overmarketized, R&D engineers are at high risk of downgrading their living standards and facing double job insecurity. Therefore, they must manage their work and life in an enterprising way to maximize labor value and prevent it from being devalued.

Keywords: Labor control, Work autonomy, Self as enterprise, Self-management, Knowledge worker

Introduction

Over the past 40 years of reform and opening-up, China's economy has gradually caught up with those of developed countries. Initially, China joined the global economy as "the world factory," producing low-end and labor-intensive products. The past decade has witnessed the rapid development of the high-tech industry, which plays a leading role in China's industrial upgrading. In 2015, the share of the added value of the high-tech industry in China accounted for 29% of the global total, ranking first in the world, and surpassed that of the United States for the first time (Hu and Ren 2017). The high-tech industry has also made outstanding achievements in research & development (R&D), as well as independent innovations. The number of valid patents held by this industry sector in China was only 1443 in 2000 but increased to 425,137[1] in 2018. In 2019, the number of international patents in China under the framework of the Patent Cooperation Treaty (PCT) was 58,990, standing at number one in the world. In addition, as the largest exporter of high-end technological products in Asia, China accounted for 43.7% of all Asian exports. Moreover, fast-rising companies such as Huawei, ZTE, Ziguang,

[1] The data come from the National Bureau of Statistics, National Development and Reform Commission, Ministry of Science and Technology (2011) and the Department of Social, Science and Technology, and Cultural Statistics National Bureau of Statistics (2020).

and BOE have gradually grasped cutting-edge core technologies such as 5G and electronic chips, which has strengthened the global competitiveness of these world-beating companies. As the high-tech industry becomes even more important and leads China's economy toward high-end development, it is especially crucial to scrutinize the production and labor management practices in the high-tech industry.

Western scholars suggest that labor control in knowledge-intensive industries is characterized by soft and indirect forms of management considering the complexity of tasks, the uncertainty of work output, and the intangibility of the mental labor process (Drucker 1999). Soft management highlights the common interests between the company and its employees, which mitigates the conflict between labor and capital (Benner 2002; Kelly 1999). Some scholars hold the optimistic view that a new knowledge/creative class with more autonomy and high authority will come into being as with the development of the knowledge economy. In this respect, the meaning of work is more akin to a way of achieving self-actualization rather than simply a means of livelihood (Bell 1976; Florida 2002).

However, the above-mentioned viewpoints do not seem to fit with the case of China's knowledge workers. In March 2019, a few engineers launched an online campaign against the so-called 996 work schedule, expressing their strong disapproval of excessively long working hours.[2] Buzzwords employed by these engineers, such as the "IT migrant workers," "code monkeys," and "bricklayers," highlight the gap between expected and actual working conditions. This becomes evident when engineers discuss the reasons for their poor working conditions. Taking long working hours as an example, engineers deny the 996 work schedule is the cause of long working hours. In their opinion, frequent overtime work is more of an independent choice than a mandatory requirement. On the other hand, they complain that such a "choice" is being "forced" to a large extent and not made at their will. To resolve these issues, we need to examine labor control and its relationship with work autonomy in the knowledge-intensive sector. This study intends to unravel this empirical puzzle by examining the production regime of R&D activities based on a case study.

Telecom Technologies Co., Ltd. (hereafter referred to as Telecom),[3] a large transnational corporation, is selected as the case for the following reasons. First, Telecom management is relatively stable and systematic. Telecom's outstanding performance in obtaining global market share and patents manifests the effectiveness of its management and thus provides a strong case through which to examine labor control in knowledge-intensive work. Second, the corporate culture and its management of labor are representative of its industry in the sense that some of its managerial strategies, such as the "rank and yank" system and the profit-sharing scheme, have been widely used in high-tech companies. In addition, the management of Telecom has been regarded as a template for Chinese companies to learn from, which signifies some of the trends of labor control in the high-tech industry. The research data are mainly collected through 70 in-depth interviews with project managers, employees in the human resource department,

[2] "996" refers to a mandatory 9 a.m. to 9 p.m. six-day work schedule adopted by some Chinese high-tech companies.

[3] In terms of anonymity, the names of the enterprise, the departments, and personal names in this article are all pseudonyms. In addition, all the traceable figures and textual information of the company have been obscured.

and R&D engineers at Telecom from 2014 to 2020. Secondhand data, including official information, books, and news about Telecom, as well as blogs and comments posted by employees on Telecom's official Bulletin Board System (BBS), also provided vivid and valuable data for this research.

Literature review and theoretical framework

Labor control aims to reduce the uncertainty during the production process and ensure the production and reproduction of surplus value. Since workers' autonomy has been regarded as the main source of uncertainty in production, employers often focus on how to deal with autonomy in designing and changing management strategies. The collective resistance of industrial workers and the rise of knowledge-based production have forced employers to continuously adjust their management strategies, which has led to the emergence of responsible autonomy and normative control as major controlling strategies. However, scholars still hold dichotomous perspectives in their understanding of the relationship between autonomy and control, which impedes a comprehensive understanding of the labor control of R&D engineers. This paper introduces the concept of "self as enterprise" by Foucault (2008) into the analytical framework. This section will first review theories of labor control and autonomy and then put forward the analytical framework for the study.

From "deskilling" to "manufacturing consent"

Labor process theory indicates that workers' subjectivity often serves as a potential threat to production and therefore is the object that needs to be suppressed by capital. Coercive control and the deskilling of the labor process are the dominant forms of control during the early periods of capitalism and monopoly capitalism (Marx 1976; Braverman 1974). Workers are treated as "obedient screws" who repetitively conduct unskilled tasks following managers' instructions. The separation of conceptualizing and executing work tasks enables capital to maintain control over the labor process, thus making the process of production less dependent on workers' autonomy and discretion. This "deskilling" of labor has also been found in the service industry. Service workers' bodies, emotions, language, and interpersonal interactions are all managed in a standardized and routinized way as manual workers on an assembly line (Hochschild 1983; Leidner 1993).

However, workers are not as obedient as machines. Slackness, machine damage, strikes, and collective resistance occur from time to time. As Marx once predicted, the accumulated discontent and conflicts of interest may inspire workers to form a class for themselves and overthrow the capitalist mode of production (Marx 1976). However, such a prediction has not yet been realized since capital–labor conflicts have been mitigated by various managerial strategies. These strategies, such as "responsible autonomy," "the making-out game," and "the internal labor market," manufacture workers' consent to cooperate in production. The strategy of responsible autonomy grants workers some degree of autonomy in the labor process and requires them to be responsible for their work outcomes (Friedman 1977). The making-out game and the internal labor market not only motivate workers to work hard but also transform structural capital–labor antagonism into conflicts among workers. As a result, it camouflages the fact that

surplus value has been exploited by capital to maintain the capitalist mode of production (Burawoy 1979).

Strategies that grant workers autonomy, as mentioned above, mainly aim to mitigate the conflicts in production rather than improve the efficiency of production. This is related to previous research on the labor process that concentrates on the manufacturing industry. For low-skilled work that has been standardized and is highly repetitive, employers are able to control the rhythm, output, and quality of production to a large extent, and workers' autonomy only has a limited impact. However, it is difficult for R&D work to be managed in such a "deskilled" way (Drucker 1999) since the efficiency of R&D work will be greatly affected by the autonomy of R&D engineers. Unexpected problems always happen during the R&D process. Whether workers can find the crux of or the solutions to a certain problem in time will directly affect the progress and quality of the R&D project. Therefore, the success of R&D activities not only depends on workers' willingness to produce but also on their motivation to improve production efficiency. Normative control that shapes work motivation has become a widely used strategy to control knowledge work.

Normative control

Normative control indirectly guides individual behavior by shaping ideas and identities (Kunda 2009:11; Zhuang 2018). Discourse often serves as an important medium to shape ideas and identities, and corporate culture is the carrier of value constructed and disseminated by management. Through the analysis of corporate culture, management discourse, and the interactions among managers and employees, the existing literature has explored how management uses discourse technology to instill values into workers' minds and organize them into a "community of interests" which shares the same vision for their company. This also ensures that workers who are not under direct supervision may still spontaneously regulate their working behaviors in a way that is conducive to the profitability of the company (McKinlay and Taylor 1998).

The empirical studies focusing on normative control in actual work situations are still inadequate. Previous studies have generally focused on discourse analysis, with discourse often being regarded as the only medium to embody and realize normative control, which exaggerates its role in shaping values. It is more difficult to control people's thoughts and values than their behaviors. Under a non-permanent employment system, the high turnover rate makes it difficult to successfully "brainwash" employees within a short period. Some research finds that workers rarely accept corporate culture completely and thus deny the effectiveness of normative control (Cushen and Thompson 2012; Ackroyd and Thompson 2016). In addition to discourse, companies also adopt various strategies, such as tight scheduling, performance management, and profit-sharing programs, to regulate the behavior of their employees. The existing literature isolates normative control from other control strategies and ignores the interplay of different strategies, which impedes our understanding of the mechanism of normative control in the practical labor process of R&D engineers.

Furthermore, the analysis of existing studies is largely at the organizational level, without exploring the relationship between the internal management strategy and the external, macro-level social structure and culture. However, how these two dimensions match

each other may affect its implementation and validity. Hence, a comprehensive understanding of normative control should put managerial strategies into the socioeconomic context in which they are embedded.

Production regime in China's market economy

The theory of production regime provides us with a systematic analytical framework to integrate macro-level factors with micro-level managerial strategies and workers' subjectivity (Burawoy 1983). Burawoy suggests that state interventions will affect the mode of labor control through labor protection and the reproduction of labor. The labor protection system sets limits on employers' decision-making and thus forbids them from adopting coercive means arbitrarily when managing workers. The social security system could protect workers by reducing their dependence on wages for subsistence and improving their bargaining power against employers.

In China, the state plays an important role in shaping and regulating the production regime. During the phase of state-owned enterprise restructuring, the gradual disintegration of the work unit system and the lack of sound social security and labor protection systems led to the appearance of "disorganized despotism" (Lee 1999). After China joined the global production network, the dominant mode of the production regime was still the despotic regime characterized by coercive control over labor. This regime is termed the "dormitory labor regime," as migrant workers' daily lives in the dormitory are also under surveillance (Pun and Smith 2007). Although some factories have begun to adopt soft control strategies in the face of tighter labor laws, labor shortages, and the rising discontent of workers, the mode of labor control is still coercive in general. The main reason is that under the current urban–rural dual household registration system, rural migrant workers, who comprised the majority of industrial workers, could hardly be protected by the social security and welfare systems enjoyed by their urban counterparts. This makes migrant workers rely heavily on monetary income. Meanwhile, the local governments' prioritization of economic development leads to their compromise in labor protection, resulting in the vulnerable situation faced by rural migrant workers. This situation is exacerbated by a lack of awareness and the means to assert labor rights (Friedman and Lee 2010; Zhang and Wu 2019).

R&D engineers and rural migrant workers are in quite different situations. R&D engineers are less dependent on capital than migrant workers and are better protected by the social security and labor protection systems. First, R&D work has not been "deskilled," which gives R&D engineers greater bargaining power. Second, R&D engineers with a bachelor's degree or above are the talent that local governments are competing for; thus, they have little difficulty settling down and can fully enjoy the social security provided by local states. Moreover, R&D engineers have more legal knowledge, which may help them protect their labor rights and benefits. It is thus reasonable to infer that companies should rely more on R&D engineers for production. Thus, labor control should take an indirect and persuasive form.

However, it is difficult to discern whether this mode of management is coercive or persuasive. It is also hard to define whether the R&D engineers' reactions are consent or coercion. Despite engineers' work autonomy in the labor process, they still complain that many of their decisions are not made voluntarily and are more "forced." The theory

of production regime can barely provide an appropriate explanation for the self-contradictory situation of such "forced consent." By referring to the analytical framework of production regime theory as its basis, this article introduces a non-dichotomous perspective proposed by Foucault to interpret the relationship between control and autonomy to investigate the self-management of R&D engineers.

"Self as enterprise": R&D engineers' self-management

Foucault's analysis of control and autonomy provides an inspiring tool for understanding self-management mediated by autonomy. He uses the concept of governmentality to refer to the set of rationales and technologies of governance that guide individual behavior. Governmentality shapes optimized ways of thinking and value systems through the hegemony of knowledge and value. Once accepted by individuals, they exercise self-discipline according to given values and norms. Such a mode of control does not directly restrict specific behavior but rather acts on the values, procedures, knowledge, and thoughts that guide behavior. In this way, autonomy becomes an important tool to realize control, rather than the opposite of control (Foucault 1982).

Governmentality entails the rationalities and technologies of government (Miller and Rose 2008: 31–32). Rationalities are a set of knowledge, concepts, and the cognitive system about the mode of governance, internal principles, and legitimacy; the technology of government is the specific means through which to implement control. Market rationality serves as the important principle of neoliberal governance. The main tool to exercise neoliberal governance is the subjects who manage themself according to market rationality. Foucault's concept of "self as enterprise" underlines the excessive penetration of market rationality from the economic field to the social field under neoliberalism (Foucault 2008:242). "Self as enterprise" not only highlights market rationality as the principle of control but also emphasizes the "self" as the medium of control.

Laborers are regarded as entrepreneurs who manage their labor power (also termed human capital under neoliberalism) following market rationality; that is, they maximize their labor reward (Rose 1989). Drawing on the notion of "self as enterprise," Pongratz and Voß (2003) developed the term "entreployee" (originally in German "Arbeitskraftunternehmer") to address the self-entrepreneurial character of workers in the neoliberal labor market. The word "entreployee" is a hybrid of "entrepreneur" and "employee." It is used as an ideal type of worker with three characteristics: self-commodification of labor power, self-control of the labor process, and self-rationalization of life. However, the authors did not use empirical data to analyze "entreployee" in the specific social systems and work contexts. The connotation and formation of "entreployees" may vary in different social and economic contexts and under different managerial strategies.

After the market-oriented reform, China's economy has been gradually moving away from an all-encompassing state-centered system toward a more market-driven economy. Laborers in China have also gradually appeared as entreployees (Wang 2018; Hoffman 2006). In the planning economy, the subject of urban workers is defined as the risk-averse "work unit man" who relies on work units for all reproduction resources, resists competition, and pursues egalitarian results under the work unit system. After the market-oriented reform, they transformed into the "independent man," who has strong autonomy in their life and work. Most of them are willing to

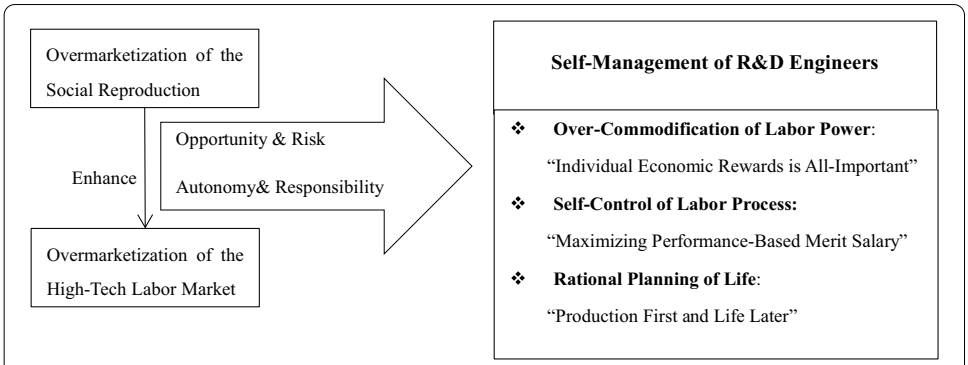

Fig. 1 Analytical framework

compete for higher labor rewards and a better quality of life. Their work motivation has also shifted from the spiritual pursuits and professional ethics of contributing to the nation and society to the material rewards under consumerism (Wang 2012). R&D engineers in the high-tech industry particularly embody such characteristics of "entreployees," and the control of R&D labor is largely achieved by the self-management of R&D engineers.

"Self as enterprise" mainly consists of two parts: "self" as a medium to achieve control and "market rationality" as the principle of self-control. Market rationality is both the criterion of enterprise management and the principle of distributions of labor and resources for labor reproduction in China. Such institutional arrangements and managerial strategies lead to the overmarketization of both R&D engineers' reproduction of current living standards and employment in high-tech industries.

In this article, the "reproduction of current living standard" refers to the reproduction of needs in excess of basic survival needs. At present, social security in China mainly aims to meet basic living needs. Therefore, R&D engineers are individually responsible for their "reproduction of current living standard." The "reproduction of current living standard" increases their dependence on a performance-based salary. As a result, R&D engineers are confronted with double risks of unemployment: the risk of being laid-off due to poor work performance and the risk of structural unemployment caused by the changing demands of the labor market.

The insufficient guarantee in both social reproduction and employment (see Fig. 1) makes R&D engineers manage their work and life according to market rationality. They constantly evaluate and enhance the value of their labor and transform their labor into currency based on the performance management and reward systems in the company as well as the labor demand in the high-tech labor market. Moreover, they divide their lifecycle into two phases based on market demand. In their youth, when their labor has high market value, the core principle is to maximize the value of individual labor and prioritize career development over personal life; in middle age and afterward (which usually refers to ages 35 and older) when they are no longer favored in the labor market, they will take more time to enjoy life. R&D engineers' organization of their job, labor process, and life under market rationality is defined as self-management.

According to the framework discussed above, this article will first introduce the social and economic background and the company's managerial strategies, which is

the basis of R&D engineers' self-management. Next, it will analyze the formation and characteristics of self-management based on firsthand empirical data. In the last section, it will examine the relationship between control and autonomy under the "self as enterprise" form of control, as well as the latent problems of the enterprising form of labor control.

The institutional background of overmarketization

The state plays an important role in the formation and operation of the labor market. After the market-oriented reform was initiated, the state gradually reduced direct interventions and highlighted the role of the market in the allocation of labor resources.[4] The state indirectly regulates the labor market through the social security system as well as through labor laws and regulations. Autonomy, individual responsibility, and market value are not only the work-related values advocated by the state (Hoffman 2006) but also the principles to be followed when formulating a social security system and labor laws and regulations. The state provides a guarantee for people's basic subsistence through the social security system, while the reproduction of living standards in excess of basic survival is the individuals' self-determined choice. In terms of labor protections, the state respects the will of workers, encourages consultation, and gives priority to economic punishment for illegal acts. The excessive marketization of the high-tech labor market is built upon the above institutional background.

Individualization and marketization of labor reproduction

Since the transition to a market-based system, the distribution of reproductive resources in China has shifted away from national coordination to market rationality. The social security system is in place to satisfy the basic survival needs of the people. At present, the social security system only guarantees basic survival needs, and it does not provide sufficient social welfare to meet people's desire for a higher quality of life (Zheng 2011). Taking Shenzhen as an example, in 2016, unemployed residents could receive a monthly unemployment compensation of 1624 yuan, which was approximately half of the average monthly consumption expenditure (of 3040 yuan) of its residents. The minimum living allowance is 620 yuan per month, which is lower than the average monthly food expenditure of 926 yuan.[5] Unemployment compensation is far from sufficient to cover housing expenditures for R&D engineers; thus, engineers can hardly rely on welfare compensation to keep their living standards after being unemployed.

The marketization of the means of reproduction causes the cost of living to be affected by market factors and the market prices of clothing, food, housing and transportation to fluctuate. If the necessary means of reproduction, such as housing and medical treatment, are allowed to be *laissez-faire*, their price will inevitably soar due to increased demand. The ever-increasing housing prices over the past twenty years are indeed an

[4] In 2019, the Ministry of Human Resources and Social Security of the People's Republic of China issued "The Guidelines on Making the Market Function Adequately to Push Ahead the Flow of Human Capital in a Smooth and Ordered Way." The document stressed once again that "the allocation of human resources shall follow the market-oriented rule, and to give full play to the market for allocation." For more details of the document, please refer to "the Ministry of Human Resources and Social Security of PRC [2019] No.7." Available at the website: http://www.mohrss.gov.cn/gkml/zefg/gfxwj/201901/t20190128_309872.html.

[5] The data come from *Shenzhen Statistical Yearbook 2017*: 420.

example of this. The housing price of tens of thousands of yuan per square meter in first-tier cities has been far beyond the affordability of most residents. People can only buy houses through bank loans and thereby become "mortgage slaves" (Driessen 2015). R&D engineers who bear thousands of yuan or even tens of thousands of yuan for housing loans every month rely heavily on stable income to maintain their current living standards. Pay cuts and unemployment will undoubtedly make their lives difficult to sustain. As one of my informants said, "There is so much pressure on all kinds of loans. I can't imagine what will happen if I lose my job for a few months? Maybe I'd have to sell the house then" (2016RD23).[6]

Under the employer-based contribution system, employment status is an important factor that determines the level of participation in social insurances (Zheng 2011), which also increases individuals' dependence on employment. Unemployed and self-employed individuals only enjoy very limited social insurance and pay higher premiums. They can only participate in pension and medical insurance schemes, while other social insurance programs, such as unemployment insurance, maternity insurance or housing funds, are only available for employed individuals. In addition to paying the social insurance premiums borne by individuals, they also need to bear what must be paid by the employers. Take the premium of pension and medical insurance in Shenzhen as examples. Employees only pay 8% of their base compensation for the pension and 2% for medical insurance, with the rest of the costs borne by their employers. However, those who are not employed pay 21% of their base compensation for pension and 8% for medical insurance.[7]

The excessive marketization of some necessary means of reproduction has increased pressure on R&D engineers to sustain their current living standards, and the social security system that aims to sustain reproduction for survival fails to reduce this pressure. Meanwhile, the tendency of the social security system to favor employment groups increases R&D engineers' dependence on their employer.

Labor protection

Market rationality and actors' autonomy are respected according to the articles of China's labor laws. This lays the legal foundation for the excessive marketization of the labor market in high-tech industries.

Respect for both employees' and employers' autonomy can be seen from the following two aspects. One is that many of the articles are not mandatory requirements, and employees' consent may relieve employers' responsibilities for labor rights violations given some provisions. As long as the worker agrees, some illegal acts, such as failure to pay overtime and not allowing employees to take paid leave, could be deemed legal. Another is that labor laws encourage both parties to settle disputes through negotiation rather than the legal system (referring to Chapter 10 of the Labor Law of the People's Republic of China), which threatens workers' rights. Workers' labor rights and

[6] The code "2016RD23" is created using the year when the interview was conducted, types of the work of the interviewee, and the sequence number of the interview. 2016 refers to the interview being conducted in the year of 2016. The work type code "RD" refers to R&D work.

[7] For more information, please refer to Article 11 of "the Regulations of Shenzhen Special Economic Zone on Social Endowment Insurance" and Articles 8 and 11 of "the Regulation of Shenzhen Municipality on Social Medical Insurance."

benefits are often compromised or sacrificed, especially when workers depend heavily on employers and have weak bargaining power in the labor market. The high costs of living makes R&D engineers unable to bear the consequences of unemployment and wage cuts. To keep their jobs and income, they are inclined to appear content with their employer even when their rights have been violated.

Economic compensation is the main form of punishment, which makes the cost of transgressions easily calculable. Except for cases involving personal injuries and crimes, most of the penalties for infringement of labor laws and regulations are in the form of economic compensation (referring to Chapter 12 of the Labor Law of the People's Republic of China). Take a common case that R&D engineers often encounter as an example. According to Article 85 and Article 87 of the Labor Law, when the company does not pay overtime, the employee shall claim from the employers an additional 50 to 100% compensation; furthermore, if the company terminates contracts illegally, then the compensation is twice the economic compensation standard stipulated in Article 47. The potential threats of punishing illegality based on economic compensation lie in the fact that employers would consider illegal actions as an option with economical cost–benefit calculations. Tort becomes an optional behavior. R&D engineers also calculate whether to protect their own rights based on the logic of cost–benefit calculations. Therefore, the protection of labor rights has been weakened, which creates conditions for the excessive marketization of labor.

The "knowledge capitalist"

The central strategy of labor management in Telecom is to shape and strengthen the subjectivity of R&D engineers as "knowledge capitalists." Corporate culture provides the values and principles for the self-management of R&D engineers, while performance evaluation, performance-based reward systems, and the "bottom out" form the practical rules of performance competition that direct workers' self-management of their careers, labor processes, and life plans.

R&D engineers are "knowledge capitalists"

The corporate culture of Telecom redefines employees' identity and relationship with the company. Employees no longer "sell" their labor power to earn a living, as defined by Marx's theory. Instead, they become "knowledge capitalists" who invest knowledge and technology into the company's business. Traditional capitalists invest monetary capital to make profits, while knowledge capitalists offer knowledge and technology as a new form of capital. Both the company and the employees are self-responsible investors following market dynamics and bearing the responsibility for and risks of their choices. The relationship between the two parties is an exchange relationship.

Employees who identify as "knowledge capitalists" are termed "*zhi ben jia*" in Telecom.[8] "Knowledge capitalist" differs from "laborer" in the following two aspects.

One aspect is that knowledge capitalists are responsible for labor input and output and are allowed to obtain a portion of the "surplus value." In the 1990s, Mr. Chen, the

[8] Since the words used by Telecom to refer to the employees who agree with the corporate culture are traceable, the Chinese abbreviation of "knowledge capitalist" is used here to replace it to ensure anonymity.

founder of Telecom, suggested entitling workers to the "residual claim"; he stated that "other companies are too concerned about the profits of entrepreneurs, while we care more about the interests of employees. If we insisted that all the capital only belongs to the original financial investor, we would deny the laborers' ownership of the surplus value they create and deny the residual ownership of intellectual and knowledge capital" (BK01:132).[9] Since then, Telecom has shared profits with high-performance employees in the form of bonuses and stock options.

The second aspect is that the relationship between the "knowledge capitalist" and the company is a contractual relationship based on equivalent exchange. Senior managers believe that the affectional tie is built upon asymmetric exchange, which is the result of the company's generous rewards which exceed the employees' contribution: "We don't need employees to be grateful. If they were grateful to the company, it must be that the company pays too much, more than his contribution… It is a contractual trust between the company and its employees, so we don't need gratitude or affectional ties" (WEB-201701).[10]

Even if organizational identity and a sense of belonging are conducive to work efficiency, Telecom does not intend to compensate employees for their commitment. This is demonstrated by two cases. One is that the CEO of Telecom directly rejected R&D engineers' request for lowering the prices at the canteen; another is that the founder questioned the necessity of an "employee satisfaction" survey. The CEO, who is in charge of employee welfare, rejected the request for the price reduction and sent an open letter on the matter, which asked employees to "[not] act as Grandet, who is not willing to spend money to maintain his basic life… How can people who haggle over every ounce work efficiently? The right way is to work hard, increase income to improve your life." Mr. Chen forwarded the letter to the entire staff, emphasizing once again that "the logistics department should follow the rule of the market." Mr. Chen also stopped the administrative department's survey on employee satisfaction. "How can there be an inexplicable survey on employee satisfaction? Who initiated it? What if they were not satisfied? How could we pay for their satisfaction? Have they given their credit card to you?… We are not an organization that operates based on public opinion." It is clear that Telecom will not change its market rationality principles to cater to employees.

Labor input is regarded as the independent investment of "knowledge capitalists." To improve output, R&D engineers have to increase labor input (time and effort), which may result in impaired labor rights. By promoting "knowledge capitalists," the company faces the choice of pursuing profit or protecting labor rights. For employees who refuse to become "knowledge capitalists," the company strictly abides by the laws and regulations to protect their rights but does not share the "surplus value" with them. As Mr. Chen said, "Laborers [employees who disagree with the identity of "knowledge

[9] The original text is quoted from the book on the corporate culture of Telecom written by a senior management consultant. The book describes in detail the history of the establishment of the company's corporate culture and explains its corporate values. To ensure anonymity, the content of the original citation has been deleted and modified. The code "BK" refers to the book, "01" is the code number given by the author according to the publication year order, and 132 is the page number of the citation.

[10] The original text is quoted from an article published by the senior managers of Telecom on the internet in January 2017. The article interprets the definition of the relationship between Telecom and its employees and records the discussion of the senior managers on this issue.

capitalist"] shall be protected in strict accordance with the law, such as paid leave and extra-long maternity leave. However, their wage is fixed and can only be equivalent to the average level in the same industry. Knowledge capitalists need to give up some rights voluntarily, such as overtime pay. However, they could enjoy the shares of the internal phantom stock and the annual bonus. All efforts would be rewarded" (BK02:88).

Almost all employees choose to give up part of their labor rights and become "knowledge capitalists." This is a rational decision made after weighing the pros and cons rather than a strong identification with corporate values. In fierce competition, there is almost no space for employees who want to preserve their legal rights. The overwhelming workload makes overtime inevitable. If not working overtime, engineers face the risk of being dismissed due to poor performance, while their work tasks can hardly be completed within regular working hours. Moreover, the annual bonus and stock compensation account for a rather large share of their total income. R&D engineers would rather give up some of their labor rights to obtain this "surplus value." Therefore, R&D engineers' commitment to their identity as "knowledge capitalists" and its related work ethic does not result from the internalization of corporate values. Performance-based rewards plays a greater role.

The pricing and rewards of R&D work

Telecom rewards and dismisses its employees according to the market value of the employees' labor. When recruiting, the company measures the labor value of candidates based on their educational background, professional skills, and work experience. After being employed, real-time performance is the most important aspect of the measurement of the value of engineers' labor. Telecom adopts outcome-oriented performance evaluation that takes output as the measure of performance evaluation. In addition, there is no fixed standard for this evaluation. The performance appraisal is reviewed in comparison with other engineers of the same rank. This form of appraisal was derived from the forced ranking program at IBM, which was originally developed by Jack Welch while he was at General Electric (Welch and Byrne 2003). The core idea of forced ranking is to place workers into different grades in accordance with their output and then encourage the most productive workers by offering rewards while weeding out those with the lowest ranks. There are five grades of performance in Telecom (from high to low): A, B+, B, C, and D. The top 5% to 10% are rated A, the next 40% are B+, then 45% are B, and the bottom 5 to 10% are C or D.

Such a forced ranking pushes employees to improve their work efficiency and output by sharpening internal competition. Performance evaluation is based on the market value of the task. Therefore, striving for tasks with high market value is the first step toward gaining an advantage in performance evaluation. Work tasks include mandatory tasks assigned by supervisors and tasks that employees strive for. To obtain an advantage in performance evaluation, R&D engineers will avoid low-market value tasks in favor of high-market value tasks while promising shorter completion times and higher-quality standards. This also leads to the excessive workload of R&D engineers.

The quality of the finished tasks and the contribution of the task to overall performance are the primary criteria for performance evaluation. In addition to meeting the preset quality standards, engineers and their department heads are held responsible

for their work quality during their employment period. The relative contribution of tasks to company performance is the key factor that affects performance ranking. The more quantifiable the tasks are, the more competitive the employees are. Li Huan is a new R&D engineer who just graduated with a doctoral degree. He proposed an idea that helps reduce the cost of one product. He attributed this as the deciding factor to his ranking of A+: "The reason that I easily passed the appraisal of my probation and became a regular worker is that I had made a patent that could save 5 yuan for the cost of each product. We produce 200,000 pieces of it each year, so 1 million yuan a year could be saved" (2020RD71).

In Telecom, performance ranking not only affects merit pay (including cash bonus and stock options), salary increases, promotion opportunities, and job transfer opportunities but also determines the layoff list. Employees with the performance rankings of A and B+ can obtain an annual bonus equivalent to at least three to six months' salary, a certain number of stock options, and opportunities for salary increases and promotions. When department performance is good, employees with a B ranking can obtain a bonus of no more than two months' salary. There are no fixed indicators for the specific salary increase, share allotments, and promotion opportunities. All will be according to the department's performance and an assigned number of shares. The merit pay for new employees with high-performance accounts for approximately one-third of their total income. The proportion of merit salary increases and becomes the main component of income after an employee has been promoted to a certain level. The fixed base salary, which is not affected by performance, is bombastically called "pocket money" within Telecom. Employees with the performance of C or D cannot receive any bonuses, shares, or promotions. Worse still, they are at the risk of being dismissed. If employees with a performance of B have not improved their performance rank for three consecutive years, they will also face the risk of being dismissed. As early as the 1990s, Telecom adopted the "last elimination policy." Employees ranking in the last 5% in the performance evaluation for the year will be dismissed regardless of their performance in previous years.

Therefore, labor value is not determined according to the fixed standards for quality and completion time that has been set in advance. It is a relative value fluctuating with the work results. Correspondingly, remuneration and the term of employment are also determined by performance ranking. The employment practice of "more pay for more work, survival of the fittest" motivates R&D engineers to strive for high performance. By generating competitive pressure and intensifying internal competition, Telecom successfully makes its employees autonomously put in more time and effort to achieve higher performance.

Double unemployment risk and shortened career span

At present, the vast majority of high-tech companies have adopted the last elimination strategy. Performance and work intensity are important factors that affect employment decisions. When the outcome-oriented performance evaluation and the last elimination system become the mainstream managerial strategy, competition in the high-tech labor market becomes increasingly fierce. The overmarketization of the high-tech labor market emerges in such a circumstance.

Overmarketization is mainly demonstrated in four aspects. First, internal competition is quite intense and remains increasingly so, while performance evaluations are made by comparing peers' performance. Second, existing employees also face competition with external job seekers, while all positions remain open to the external labor market. In addition, it is technical skills and performance, rather than seniority and experience within the company, that are most valued in employment decisions. Thus, the existing employees have no competitive advantages. Third, employees are under double job insecurity. In addition to the risk of being dismissed due to poor performance, they also face structural unemployment caused by changes in market demand and the rapid change of leading technology and mainstream products. Last, laid-off employees face difficulty finding jobs with a comparable salary level, while all enterprises favor young graduates and high performers.

In the high-tech industry, with its fast-changing technology and labor market, the work experience accumulated over time is no longer conducive to the improvement of production efficiency. Senior employees with long work histories no longer have employment advantages. In terms of mastering new technologies and knowledge, they are not as effective as recent graduates who have received systematic training in full-time study at university. From the perspective of work contribution, the working hours and energy that married seniors with children are able to put into their work are less than those of single young people. From the perspective of labor cost, the cost of employing young graduates is lower than that of senior employees. Therefore, companies tend to employ graduates who have received systematic training and master the latest scientific and technological knowledge to replace senior employees. One interviewee said, "35 is the age with sin." Some companies clearly list the requirement of "under 35 years old" in the recruitment requirements. Some other companies no longer renew contracts with employees over 35 years old. As a result, the career of R&D engineers is shortened, and they become a professional group akin to models, actors and athletes. Only a few of them stay as senior managers, and the rest are eliminated. Therefore, R&D engineers face great unemployment pressure.

Market-oriented employment transforms R&D engineers into business partners with independent responsibilities. The company does not manage the labor of R&D engineers through monitoring trivial behaviors in the labor process but rather through the introduction of a market competition mechanism and the transfer of market risk to R&D engineers. By shaping the opportunities, risks, benefits, and costs behind employees' choices, the company can guide their decisions and behaviors. When R&D engineers complete their work and produce profits for the company, they can obtain economic returns; when they cannot finish their work on time, their income will suffer immediately; when their job and skills are no longer conducive to the value generation of the company, they will be dismissed.

From the above management strategies, R&D engineers have strong autonomy in their choice of whether to identify as a "knowledge capitalist" and other work-related decisions. They can choose whether to become a "knowledge capitalist," actively strive for tasks with high market value, negotiate task arrangements with their supervisor, and adjust their work schedule according to the project schedule. While they have autonomy, they also have to bear market risks, including structural market risks beyond their

individual control. In this overmarketized employment relationship, managing personal human capital according to market dynamics is a necessary skill for R&D engineers to have.

Self-management of R&D engineers

When neither reproduction of current living standards nor employment is guaranteed, the work and life of R&D engineers are uncertain and full of opportunities and risks. They must mobilize their individual autonomy to present, enhance, and fulfill their personal labor value and protect their personal lives and work opportunities. The unemployment risk in the high-tech labor market intensifies the urgency of maximizing labor value during the employment period, which persuades them to not only strive for high performance but also to take the realization of labor value as the priority in life. This section will describe the characteristics of R&D engineers' self-management in three aspects: overcommodification of labor power, self-control of the labor process, and self-rationalization of life.

Overcommodification of labor power

The overcommodification of labor power implies that the commodity attribute of labor is overemphasized, and economic labor return becomes the most important or even the only index with which to measure the value and meaning of one's labor. R&D engineers overcommodify their labor in two senses: (1) that "making money" becomes the most significant work motivation, and (2) that the meaning of work to the collective and the motivation to contribute to society are gradually eroded. Personal benefits become the only concern. R&D engineers define themselves as "technology merchants" and emphasize the economic and commercial nature of their work. Job satisfaction and sense of achievement also come from economic rewards.

> *We are not scientists. We are technical merchants. Most products are designed to meet the needs of others... Happiness may depend on your accomplishment and recognition that you can get something from it, such as a bonus for high performance. This may be the source of happiness. The person who gets satisfaction from work itself may be one in a million (2017RD52).*

Economic rewards are the most important factor affecting R&D engineers' career choices. Xiaolei, who graduated in 2010, received offers from three companies and finally chose Telecom because it offers the highest base salary. "There were still two other (job opportunities) at that time. One was an airline with 5000 (per month as basic salary); the other was Samsung, in Dongguan, with 4700. Telecom gave me 6000, so I came here" (2017RD8).

In addition to salaries, engineers are also concerned about whether work is conducive to developing skills and competitiveness in the labor market. If the job position is in one of the core business units of the company, if the product to be developed is in demand in the market, if the technologies being used are cutting-edge technologies that are in high demand in the industry, and if the transferability of skills is higher, then the job is believed to be a good job that will help increase R&D engineers' labor value. In the 630 resignation blog posts collected by the author on the company's official forum, more

than 70% of the job leavers listed "lack of the chance to increase competitiveness" as one of the most significant reasons for turnover. One of them shared,

> *Over the years, almost all of the chips that I involved in the development of have the same structure and technical solution. There is no obvious improvement in terms of skill. As a programmer, I feel that I can't survive with the company and the department. I have to make a change. I'm afraid I won't be competitive when I am getting older and still know so little (BBS-2019110).*

This indicates that when R&D engineers measure their own labor value with respect to the value of their position within the company, they take their current income and increase in personal labor value as the standard. In their job decision-making, they consider the interests of individuals, not the interests of departments and companies. Under a corporate culture that emphasizes the contractual relationship with employees and weakens emotional ties, R&D engineers also define their relationship with the company as an exchange relationship built upon market rationality. Most respondents cited the word "company is not home"[11] to emphasize their non-affective relationship with the company.

> *Don't think of the company as your family. The company pays you to work and to create value for it. Don't have unrealistic expectations on the company. The company has no obligation to give you anything other than money and position. I only care about the present and future income that the company can give me. I haven't left (job-hopping) because I haven't found a better opportunity... We are in a business relationship and cooperative relationship. The boss made it very clear on this point (2016RD56).*

This kind of "business cooperation" is rational, benefit-oriented, fragile, and unstable. Even if employees have no intention to leave, for the time being, they will check recruitment advertisements and send out their resumes to update their information about market demand, evaluate their market value, and plan their self-learning accordingly. When personal economic benefits become the highest value of work, economic benefits not only affect R&D engineers' job decisions but also their self-management in the practical work process.

Self-control in the labor process

Performance management plays a leading role in how R&D engineers control their labor processes. R&D engineers will manage their work processes in a way that ensures higher performance. Given the fierce competition, being proactive is believed to be a necessary characteristic to achieve better performance. "Completing the assigned tasks cannot guarantee good performance… only if you are proactive will you have the chance

[11] In 2004, an employee who was dismissed during the downsizing wrote a blog titled "Company is not Home." The blogger's reflection on his relationship with the company has aroused great resonance. Since then, "company is not home" is often used to emphasize the essence of the exchange relationship of business interest between employees and companies. It says that: "the relationship between employees and the company is the relationship of interests. Never regard the company as your home. I will keep working hard. And I won't complain that the company owes me anything. There is a reason why the company treats me in this way. What the company has done for me is the rewards for my contribution. What the company gives to me is different from my parents' selfless giving."

to undertake tasks of higher technology and surpass others in performance evaluation" (2015RD28).

In addition to actively investing enough time and effort in work, R&D engineers also need to strive to obtain more resources and support from project managers to improve the efficiency and quality of their tasks. "You should strive for everything by yourself. You have to fight for all the resources for the team. You have to bring it up by yourself, or they won't give it to you. You need to be very proactive" (2015RD17).

Some tasks are difficult to evaluate quantitatively. In such circumstances, R&D engineers need to "publicize themselves" and the value of their work output.

> *Sometimes your achievements cannot be seen if your tasks are not related to the specific project to be delivered. So you need to show your achievements, and you need to report to the managers, which is similar to self-promotion. If not, others won't know what you have done. You need to let them know what you have researched and analyzed, whether your work has a contribution to profit-making, whether you have provided new solutions to the problems (2018RD22).*

In terms of working time, R&D engineers will adjust their time spent on work according to the company policies and the highest remuneration criterion as long as the task completion is not affected. Taking overtime as an example, there is no overtime pay for overtime worked on weekdays, while weekend overtime hours are paid at twice the regular wage. Therefore, R&D engineers prefer to put aside non-emergency tasks and conduct them on weekends. "I could finish that thing if I work overtime in the evening [on weekdays]. However, it is not worth working overtime at night, as there is no overtime payment. So I leave the office on time and leave it to the weekend" (2017RD1).

Extremely fierce competition will also have a negative impact on the R&D working environment. At present, the most remarkable phenomenon that can be observed relates to internal cooperation. Performance pressure makes short-term profits the essential condition for cooperation. Regarding interpersonal cooperation, R&D engineers have a competitive relationship with colleagues of the same positional rank, and taking time to help others may be detrimental to their own performance. Therefore, it is difficult to achieve informal cooperation among individuals: "In fact, our decisions (to cooperate or not) are affected by internal performance competition. It's your business, it's none of my business. It's not helpful to my performance at all if I did it for you. Then, why should I help you?" (2015RD05). In terms of team cooperation, performance competition weakens interdepartmental cooperation. Without instructions from a super and clear return, it is difficult to promote interdepartmental cooperation, resulting in a phenomenon called the "department wall." "Department walls form because no one wants to take responsibility. If something goes wrong, what can I do? I would rather not do it at all. It has nothing to do with my work performance. Benefits are still a big motivation. Everything I do is for performance" (2015RD28). The lack of willingness to cooperate internally will hinder the internal flow of knowledge and innovation.

In terms of the decision-making and behavior of R&D engineers in the labor process, outcome-oriented performance management improves engineers' enthusiasm and initiative toward the work process. The self-discipline of R&D engineers based on performance evaluation standards helps overcome the difficulty of directing and monitoring

R&D work. The company is able to control the labor process by tightly controlling the work outcome.

However, performance management will also have a negative impact on R&D cost and efficiency. What R&D engineers are most concerned with is personal interests rather than the interests of the team and the company. When there is a conflict between individual and collective interests, R&D engineers are more likely to maximize individual interests at the expense of the company's interests. In the long run, performance-based self-discipline is not conducive to internal cooperation and further impedes the efficiency and quality of R&D work.

Rational planning of life

In addition to economic needs, people have other needs as social beings. When there are conflicts between needs, R&D engineers must choose between economic rewards and other social needs. Most of them will choose to "produce first and live later." They have to convert the market value of their labor into real income to the degree possible while they are still competitive in the labor market to establish an economic foundation for their future security. R&D engineers are anxious even if their current salary is as high as tens of thousands yuan per month. "Even if you have a car and a house, any accidents, such as a serious illness, your child's education, your parents' serious illness, may soon make your life back to "the pre-liberation era" (implying the years of material deprivation). You still cannot sit back and relax even though you own a house and a car. Your anxiety remains strong" (2016RD27).

Confronted with the burden of economic pressure and insecure employment, R&D engineers divide their life cycle into roughly two stages. When they are young, career development and wealth accumulation are taken as priorities. Other needs are all postponed. It is not until they are age 35 or older—when they start to be devalued in the labor market—that engineers cease to always put work first and start to enjoy their lives. Li Peng, a 26-year-old new engineer, broke up with his girlfriend because of the lack of companionship caused by frequent overtime work. He did not intend to win his girlfriend back since he believed frequent overtime was inevitable and out of his control, and he believed that money was of the most importance at his age: "It's very difficult to say no (to overtime work) and I certainly can't accompany her… I'm pessimistic now, and I think my marriage will not be happy… It's more important to work hard before the age of 35. We have no choice but to put money first" (2017CM18).

Market rationality has penetrated engineers' personal lives and become the key principle of their self-management. The idea of "production first, life later" reflects the difficulty of achieving work–life balance. Through self-management, the conflicts of interest between labor and capital are transformed into R&D engineers' personal dilemmas. Taking time allocation as an example, although the extension of working time is conducive to productivity, it will reduce the available time for family life, social interaction, rest, and entertainment. R&D engineers have to accept the consequences of the erosion of private non-working time. Some have missed many important personal moments since they need to work overtime and cannot ask for leave: "My wife had a miscarriage, but I was not around; I was also not around when my sister got married… my uncle died in 2019, and I could not go back because of the project. Colleagues did not know, the

project manager did not know, there was only crazy overtime" (BBS-2019002). Some people have physical problems due to overtime work and the lack of rest. They joke that this way of life is "to exchange life for money before 40 and money for life after 40."

Self-management of R&D engineers

The mechanism of the "self-enterprising form of control" is based on the subjectification of the market mechanism (Rose 1992), which refers to individuals internalizing market value as the core value of their behavior. As a type of governance, the "self-enterprising form of control" includes market rationality as the governing principle used to construct the operational field in which the market mechanism functions. Existing studies focus on its values and address the decisive role of value internalization in shaping the subjectivity of workers (Kunda 2009). The self-management of R&D engineers in this study shows that self-management can still work even when the subject does not agree with corporate values. R&D engineers are suffering the negative impacts of the "self-enterprising form of control" on their work, life, and health, which leads them to question the legitimacy of market value. Despite their disagreement with the principle of market-oriented value, they still accept their identity as a "knowledge capitalist" and manage themselves according to market rationality and the rule of internal competition. Therefore, it is argued that the "self-enterprising form of control" does not necessarily lie in the internalization of values. Social institutions and managerial strategies play a significant role in the formation of R&D engineers' self-management.

The medium of the "self-enterprising form of control" is the autonomy of workers. When workers did not agree with the governance principle oriented to market value, the control was mainly implemented through the delicate design of the rules, rewards, and punishment of choices and behaviors. All of these institutions and strategies make following market rationality the optimal choice for engineers to secure their job and earn a better life.

After market-oriented reform, the market mechanism, as an important governance principle, prevails in the redistribution of social reproduction institutions, the labor production and managerial practices. Reproduction of current living standards and overmarketization of the high-tech labor market make self-management the best way for R&D engineers to keep their jobs and maintain their existing living standards. The overmarketization of the reproduction of current living standards causes the cost of living to exceed their disposable income gradually, and R&D engineers become debtors who must rely on a stable high income to maintain their lifestyles. Although the overmarketized employment relationship provides opportunities to earn a higher income by improving individual performance and work capacity, it transfers many market risks to R&D engineers. Seemingly, non-mandatory management means that R&D engineers have more autonomy. They can choose whether to exchange unclaimed paid leave for bonuses and dividends, whether to work overtime for a higher performance rank, and whether to give up family time for career development. However, in the absence of employment and lifestyle security, self-management according to market rationality becomes their only choice. The "forced consent" of R&D engineers indicates that autonomy under self-management is "limited autonomy."

When R&D engineers do not support the market mechanism, their self-management must have two conditions: (1) the possibility for individuals to maintain the reproduction of current living standards based on their income obtained through personal efforts, which is the driving force of self-management and (2) the condition that R&D engineers do not have alternative ways to obtain the resources of reproduction of current living standards except salary.

With the growth of urban consumption, especially home prices, it is increasingly difficult for R&D engineers to maintain a decent life in developed cities. If the company cannot raise the salary correspondingly, the R&D labor force might gradually shrink. R&D engineers either move to inland cities with relatively low living standards or switch to occupations with lower work intensity. Recently, an increasing number of respondents expressed their plan to quit and move to inland cities and engage in jobs with a stable contract and lower work intensity even though the salary was lower. If a large number of R&D laborers withdrew from the high-tech labor market in developed cities, it would inevitably lead to the imbalance of high-tech labor allocation. The "self-enterprising form of labor control" will ultimately lose its efficacy when a competitive internal environment cannot form due to a labor shortage.

If R&D engineers have alternative ways to obtain reproductive resources, the "self-enterprising form of control" will not work. Currently, R&D engineers mainly have two other ways to obtain means of reproduction in addition to their salary. One is the income from the appreciation of savings and personal assets such as stocks and real estate. When the value of their assets is enough to maintain life in the city, R&D engineers will not hesitate to leave Telecom and no longer pursue jobs that have poor work–life balance. However, only a very limited number of R&D engineers have reached this economic level. Parents' financial support is more common as an important source for young R&D engineers to reduce their dependence on merit-based salaries, which further reduces their acceptance of work that sacrifices both health and family life. An increasing number of "post-90s" respondents do not intend to work for Telecom in the long term. They claim that some of their peers with better family financial status never consider work in companies that advocate sacrificing life for work.

Thus, it is reasonable to conclude that the dependence of reproduction of current living standards on high salaries is the necessary premise for the "self-enterprising form of labor control." The self-management of R&D engineers does not derive from their belief in market rationality but rather from "forced consent" arising from their social and economic situation.

Conclusion

Through a case study, this article analyzes a new mode of labor control, namely, the "self-enterprising form of control." It is an indirect form of control that relies on workers' self-management following the principles of market rationality. It is a new form of control since it presents an alternative relationship between control and autonomy. Autonomy is a positive medium for conducting the "self-enterprising form of control." The company leaves some autonomy and discretion to R&D engineers so that they can quickly respond to unexpected problems in their work process. Labor control is not realized by suppressing autonomy and placing all responsibilities under the tight control of

managers. Control is realized by guiding workers to behave in expected ways through well-designed performance management and implementing a performance-related reward system.

This kind of control does not fundamentally solve the managerial problems caused by the indeterminacy of labor. The uncertainty of labor primarily includes the uncertainty of the transformation of labor value into actual labor and an unstable total workforce due to labor mobility (Smith 2006). The "self-enterprising form of control" can induce R&D engineers to improve their work performance by distributing labor remuneration schemes to reward hard work and high performance. Meanwhile, the forced rank and bottom-out employment policies increase the cost of failure in a competitive environment. Internal competition is intensified, and the evaluation standard of work performance is raised, which forces R&D engineers to improve their performance continuously. However, in fierce competition, R&D engineers tend to act to maximize personal interests. R&D efficiency and company profits are not prioritized when they conflict with personal interests.

This self-management of R&D engineers cannot solve the problem of the indeterminacy of the total workforce when laborers have the autonomy to quit. The turnover rate is higher than that of other industries. It can be seen from the analysis in the above section that R&D engineers are always paying attention to job opportunities in the labor market and will not hesitate to leave if they receive a better offer. Telecom's strategy for dealing with its high turnover rate is to recruit many fresh graduates and provide internal job transfer opportunities to engineers who are not content with their current position. However, this strategy is of high cost. In addition, it cannot solve the negative impact the turnover of senior engineers (especially high-performance senior employees) has on the progress of R&D projects. New graduates' work efficiency is lower than that of experienced senior engineers, considering their familiarity with the existing projects, team members, work procedures, and working environment, let alone the company's extra cost to train the new graduates.

Whether the "self-enterprising form of control" is sustainable and beneficial to the improvement of technological innovation and R&D efficiency is still open to debate. At present, this mode of control has led to several problems. First, performance-oriented evaluation leads to a preference for short-term projects with lower risk, and R&D engineers are less willing to undertake projects with high uncertainty. However, the more innovative the R&D project is, the higher the risk and the more uncertainty it will have. This preference for short-term and low-risk projects is not conducive to innovation. Second, overemphasizing market value leads to a lack of team consciousness and collective responsibility. The value of one's work to the project team, the enterprise, society, and even the nation is gradually replaced by the individual's economic interests. Moreover, individual autonomy and self-responsibility are magnified in self-management mode, which covers the social causes of the problem. At the individual level, it will lead to the over "self-attribution" of failure, which will generate mental illness in the absence of timely counseling and intervention. Excessive individual responsibility impedes the detection of the causes of problems at the social and institutional levels. If the accumulated "personal problems" are not fundamentally solved, they might transform into hidden dangers threatening production and social stability.

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Competing Interests
The author declares that he has no competing interests.

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