

THE REASERCH ON CHARACTERISTICS OF KNOWLEDGE WORKERS AND THEIR MOTIVATING FACTORS: A REVIEW AND COMPARISON STUDY

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ABSTRACT

The current study surveyed major studies on the characteristics of and motivating factors for knowledge workers, both in the USA and in China. Comparisons were made between studies in the two countries, and new perspectives were offered on the motivating factors for knowledge workers. Future research directions were proposed.

INTRODUCTION

As early as in the 1950s, Peter Drucker pointed out that “the most important contribution of management was to increase the productivity of laborers by fifty times. In the 21st century, however, the most important assets of organizations are knowledge workers, and their productivity. The most important thing management needs to do, therefore, is to improve the productivity of knowledge workers” [13]. On entering the second decade of the 21st century, the roles of knowledge workers are increasingly prominent. CCP, the ruling party of China, explicitly had “strengthening China through science and education and through developing Chinese talents” as its strategy. By the same token, *The Mid-to-long-term National Education Development Program* (2010-2020) of China further emphasized the development of Chinese intellectual talents. The current study will review the literature, both Chinese and abroad, on the characteristics of knowledge workers, and based on the review and comparison, identify the preferences of knowledge workers for motivating factors.

THE DEFINITION AND CHARACTERISTICS OF KNOWLEDGE WORKER

1. Defining the knowledge worker from different views

“Knowledge worker” was first brought forth in *Landmarks of Tomorrow: A report on the New Post-Modern World* [13]. Later, many western scholars like Kidd [2], Vogt [9], Dove [38], and Davenport [42] conducted further studies about knowledge worker’s performance, motivation, and other related issues. In China, “knowledge worker” is a borrowed word, but similar words such as “intellectuals” and “brainworkers” have been used for years. Reviewing relevant literature, the definitions of knowledge worker are so diverse that they need to be classified, analyzed, examined, and synthesized.

Work content Definition based on the work content is made from several specific points of view, such as job contents, the way to complete the work, and work process. Drucker [11] referred to an individual who works primarily with information or one who develops and uses knowledge in the workplace as the

knowledge worker. Yang et al [24] emphasized on the properties of work content, and considered knowledge worker as the staff who engages in knowledge work. Based on this definition, Sun [26] held an opinion that the staff that directly takes part in knowledge work and follows this work as a profession can be called knowledge worker, such as a scientist, a teacher, and an engineer. He emphasized on the profession, to distinguish from an amateur, who does not take up knowledge work as a career. This view highlights the nature of work; but understanding of the work content is not complete and neither in sufficient depth. The meaning from this view is somewhat imbalanced.

Work output The work output could be understood as an outcome for the organization the worker is working for. This kind of definition is outcome-oriented. J-Davies et al [31] proposed that the knowledge worker is coming with the increment of knowledge capital and bringing high added value. Xu and Zhu [46] believed the knowledge worker is similar to the occupational brainworker, who makes creative contribution, brings a strong value-added growth of knowledge capital and monetary capital. From this view, one can easily distinguish two extremes of, say, scientists from porters; but there could be gray area between brainworkers and labors, especially in today's computing age when many workers are using a computer to do their job. These grey areas could not be explained accurately here.

Individual characteristics Based on the characteristics of individual, researchers summed up more general characteristics of knowledge workers from specific cases, and then made the definition of knowledge workers. Accenture (2008) defined knowledge workers as the staff who complete tasks with intellectual input, creativity, authority, including the professional, the paraprofessional with depth skills, and the senior manager. This type of workers always work in fields such as R&D, engineering design, marketing, legal service and management consulting. Cai [47] considered that knowledge workers have high degree of human capital and pursue independence, creativity, personalization, and diverse work contents. They create value by using knowledge and information. They keep on learning and creating to adapt to the complex and dynamic changes. Zhou [7] believed that knowledge workers accept systematic learning of theory and professional skills, and build up an effective knowledge structure. Knowledge workers can leverage modern sciences to achieve productivity — education was introduced in this definition. The definitions from this dimension have their advantages of being operational, that the dimension is commonly used in empirical researches. There are two shortcomings: first, there exist dozens of characteristics for knowledge workers; second, different scholars emphasized on different characteristics. Therefore, it is difficult to reach a consensus of the definition.

We believe that the above schools of thoughts can be synthesized, and a definition of knowledge worker can be like the following: they are workers who produce high value-added products and services with knowledge and ability, and keep on updating their knowledge and improving their abilities to adapt to the complex tasks and diverse work environments.

2. A meta-analysis of knowledge workers' characteristics

Existing numerous studies on knowledge worker's characteristics offer no conclusion of consent. In this study, we will summarize the characteristics by a meta-analysis. First, we used China National Knowledge Infrastructure (CNKI) as the database to conduct the search, for which we chose the fields of economy and management the scope for literature. Second, conducted an advanced search using the subjects "knowledge worker & characteristic", with 2000-2009. Third, listed the search results on citation frequency and downloaded the 1st-100th articles. Forth, skimmed through the literature and use "original study on characteristics of knowledge worker, rather than citing others' work" as the criterion, which cut down the number of articles to 64. We also studied in details the top-three ranked articles. Using statistical analysis, we identified 35 characteristics for knowledge workers. Those characteristics appeared in more than 10 studies are presented in Table 1.

Independence Compared with other types of employees, knowledge workers enjoy the rights and power to be in control of their work. In addition, they are held fully responsible for their work. “Independence” also means that knowledge workers prefer to be self-governing and self-control rather than being affixed to machines as line workers [34]. Peng [22] pointed out that knowledge workers’ independence is characterized by the act of empowerment. Empowerment has risks, because choosing the wrong person for the job can jeopardize the performance of the company.

Table1 The characteristics of knowledge workers

Rank	Frequency(*)	Characteristics	Jiang et al.	Lin	Peng
1	45	Independence	√	√	√
2	39	High level of turnover	√	√	√
3	30	Creativity			
4	30	Being difficult to supervise the work processes		√	√
5	29	Realizing self-value	√	√	
6	26	Being difficult to measure the work results		√	√
7	23	Knowledge capital		√	√
8	15	Dimly bounds of leadership and being contemptuous of the authority		√	√
9	13	Being loyal to the occupations instead of employers	√		√
10	13	Individual characters		√	

(*) The number of articles containing the character

Loyal to the occupation instead of employer; high level of turnover Knowledge workers’ high turnover rate brings a challenge to the traditional employment relation. Of industrial economy when mass production was the defining feature, tools, machines, and materials belonged to capital. The skilled employees cannot function without physical capital, such as machines, raw materials and physical plant [55]. Of knowledge economy, the knowledge employees are prominent in the most important knowledge, which is deeply ingrained in their mind. Because of this, they are much more powerful to select opportunities, far more than the traditional workers [34].

Creativity Creativity is the driving force for social advance and development and the only headspring of the value accrue for the knowledge workers. Knowledge workers work for the unprecedented and innovative results. There is no ready-made answer either the clearly-defined way for seeking for an answer to the questions [32]. Drucker [12] said sustained creating is part of knowledge workers’ task, job and responsibility.

Difficulty in supervising the work processes and measure the work performance Knowledge workers use their brains to think and make decision. It is different to accurately judge the level of their work efforts and efficiency. Lin [34] Cao [49] pointed out that it did not make much sense, and not very probable either, to monitor and control the work process of knowledge workers. Thus, the measurement of work result is another thorny problem. Firstly, the work product is the result of teamwork, instead of that of one individual’s, so it is hard to measure individual contribution [49]. Secondly, unlike in the case of laborers, quantified process of work performance is difficult [44].

Pursuing self-actualization Knowledge workers have a strong will to realize their own goals; they strive for being recognized by professional peers through their own efforts [49]. From the analysis of costs and benefits, knowledge workers should pay cost of education and training during the process of acquiring knowledge and skills, and also opportunity cost of no income as well as costs of psychological struggles. Consequently they have expectations to achieve high earnings. This earning not only means wealth and

social position, but also the compensation covering psychological costs [17]. Therefore, they prefer well-paid work with challenges.

Blurring of the boundary with leadership and defying administrative authority Knowledge workers see their relationships with the administration as an interaction with no fixed authority [4]. Knowledge is replacing administrative authority to be the only judgment standard of merits. Knowledge workers can affect their superiors, peers, and subordinates with professional knowledge and skills. So they see the boundary among classes in the traditional bureaucratic enterprise becoming blurry, and the administrative authority no longer has absolute control.

There are two reasons that it is highly complex in the area of characteristics of knowledge workers: firstly, different researchers had different criteria for classification, which lead to the overlapping contents of different characteristics; secondly, neglected the interrelationship and causality among the characteristics causing the ambiguity in identifying truly distinct characteristics.

THE RESEARCH STATUS ON KNOWLEDGE WORKERS INCENTIVE PREFERENCES IN CHINA

In the same range of information search conducted for the study in the previous section, we conducted an advanced search with the subjects being “knowledge worker & motivation” or “knowledge worker & incentive”, with the time frame being 2000-2009. There were 189 articles published in academic journals on the subjects in that time frame. After eliminating the papers not directly relevant to the current research topic, 152 articles were selected as shown in table 3. There were few researches on knowledge workers’ motivation in China before 2000. During 2004-2009, the number of relevant articles increased significantly, due to the rapid economic development of the period, and the large number of college graduates entering the workforce which caused the management’s attention to the issue of managing knowledge workers [43].

Table2 The quantity of articles published 2000-2009

Year	Article quantity	Percentage in the total
2001-2004	17	11.18
2005-2008	135	88.82
Summation	152	100%

THE COMPARISON OF INCENTIVE PREFERENCE OF KNOWLEDGE WORKERS BETWEEN CHINA AND THE WEST

Researchers in western countries conducted a great deal of empirical research on factors with effective incentives for knowledge workers, covered different professions such as college faculty, engineers, software designers in the USA, UK, Australia and Japan. The representative incentive preferences are shown in table 3 and 4, from overseas and Chinese researches respectively.

1. The common incentive preferences of knowledge workers

Personal growth and development This factor is constantly on top three in all the studies mentioned above. Knowledge workers have high quality and technical skill, and to remain competitive they are pursuit non-stop with the growth of knowledge, individual, and professional achievement. Tampoe [33] found that 33.73% knowledge workers chose personal growth as the most important incentive factor. Andersen Consulting(1994) study 858 knowledge workers from Australia, U.S.A., Singapore, Japan, Korea, and Hong Kong about the incentive factors, and found that promotion, considered as a form of

personal development, took the third place. This study was conducted in different cultural and economic backgrounds, so the results have cultural applicability. Zhang and Peng [21] survey 150 R&D workers from four major technology companies about incentive factors, and found personal growth and development ranked number two. Chen and Jing [19] found from the analysis of 302 questionnaires that, professional achievement, work environment, C&B, and personal growth were the four main incentive factors. They also found that different factor preferences exist between age groups—knowledge workers under 39 years preferred C&B, those under 29 years old valued personal growth more. Based on education background, Zheng and Huang [5], Zhang [30] all found that highly educated workers have stronger needs for growth.

Job challenge and achievement Some researchers established knowledge workers' incentive utility function, and indicated that the correlation between job challenge and achievement is positive [54], [1]. They are the decisive factors for the utility's maximization. Xian and Zhang [27] maintained that the ration and challenge of task design was the key for knowledge workers' morale. Wang et al [39] suggested that management should gradually increase the level of difficulty and enrich work contents. Furthermore, Chen [51] defined work enrichment as "the basic change of work content and accountability level, which is also the vertical extension of the responsibility of work." The work giving workers the sense of achievement is always those closely relate to the organizational strategy. Knowledge workers long for their work to be part of the organizational value chain [40], and then grow up with the organization.

Table 3 The incentive factor of knowledge workers—Studies in other countries

Researcher	Time	1st	2nd	3rd	4th	5th
Tampoe	1989	Personal growth	Work Independence	Professional Achievement	Wealth	\
Andersen Consulting	1994	Compensation	Nature of job	Promotion	Peer relationship	Decision participation
Zingheim	2001	Attractive development prospect of the organization	Opportunity to grow	Good working environment	Total compensation	\

Table 4 The incentive factor of knowledge workers—Studies in China

Researcher	Time	1st	2nd	3rd	4th	5th
Peng et al.	2001	Compensation and bonus	Personal growth	Company prospect	Challenges	Job security and stability
State Council Development Research Center	2006	Opportunity to grow	Peer relationship	Sense of accomplishment	Fair evaluation	High pay
Wang	2008	Compensation & Benefits	Quality of leaders	Personal growth	Company growth	Safety and security

2. The comparison of incentive preferences of knowledge workers between China and the West

The deference in compensation and wealth Chinese knowledge workers place more emphasis in compensation than their foreign counterparts. Yu et al. surveyed 454 samples in the US and 302 in China, and found that "higher compensation ranked number one in Chinese workers, yet was not even in top five among the US workers. The above phenomenon must be because of the economic backgrounds the Chinese workers were in. China is in economic transition period, with relatively low economic

development level. In addition, China's economic environment is one that is complex and changeable, with high uncertainty [35]. One must also note that in recent year, monetary reward is not only to satisfy workers' fundamental needs: the amount of compensation is also an important measure of the contribution a worker has made to his/her organization, and a measure of his/her social status [50]. Wang and Wang [37] proposed an incentive system combining short-term incentive – skill-based salary – and long-term incentive – stock options. Other Chinese studies also found differences in state-owned companies and private companies, as well as regional differences (for example, [52], [23], [45], [15]).

The differences in work independence and job security Knowledge workers in western countries ranked work independence as among top five factors. This could be closely related to the low uncertainty avoidance, low power distance, and high individualism western culture [14]. On the cultural backgrounds, knowledge workers value liberty higher, prefer not to be interfered too much by superiors, and are more willing to undertake the consequence of their own decisions. In this situation, it has become urgent to find the balance point between teamwork and independence [3]. As a contrast, although Chinese knowledge workers also enjoy certain flexibility in career change, because of traditional culture as well as economic development level, jobs with higher security still have greater incentive. It does not mean, however, that Chinese workers do not need the kind of self-empowerment. Traditional 9-to-5 jobs and fixed work location would limit knowledge workers' creativity and idea generation, while flexible schedule can better break the boundaries of time and space to achieve optimal resource allocation [41].

Chinese knowledge workers emphasized fairness The factor fairness, although did not enter top five in most of the incentive studies, has been more emphasized by Chinese workers as compared to their international counterparts. The reason why it would be so is that China has its special *GuanXi* background, which emphasized maintaining emotional connections and mutuality of interests. In this situation, those workers without *GuanXi* would feel or face interference in the relationships of work input and output, in work output and rewards, and in rewards and work satisfaction. Knowledge workers would, likewise, not ignore this important aspect of work environment. Therefore, we should establish more fair evaluation systems to accurately measure the contribution of employees. This is the necessary condition for internal and external fairness.

3. Limitation of Incentive Preference Research, and Future Direction

The studies reviewed above covered many aspects of the issue of knowledge worker incentive preferences. However, they were almost all on the characteristics of knowledge workers, and their needs, and attempted to derive the incentive measures from the two. There have been few that analyzed the incentive factors from the knowledge workers' behavioral dynamics. The situation is changing: literatures on workers' mental bargains are coming out gradually. The current studies on knowledge workers' incentive preferences have a lot of redundancy. The researches in China, especially conceptual studies, can be seen based on or adapted from researches of western countries. "Take the management sciences that originated in the western society, whose social psychology, culture, and behavioral norms are all very different, and introduce them into an environment with totally different psychology and culture, then the introduced management would totally likely be set idle or be distorted". We suggest here that future researches must consider the unique characters and the culture of China, through theoretical and empirical studies, to identify the incentive preferences for China's knowledge workers.

REFERENCES

Complete list of references are available upon request from the second author.