Research on Smart Artisan on Modern Apprenticeship Pattern in the Era of Artificial Intelligence

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Abstract. This paper explores the smart artisan-cultivating strategies of modern apprenticeship and builds a system of craftsmanship's upgrade under the deep integration of industrialization and information. This will play a certain role in promoting the cultivation of artisans based on the modern apprenticeship and even the progress of China's energy industry. Further, this research provides useful tools for organizational career development through the power of enterprise' examples of craftsmen.

1. Introduction

Artificial Intelligence is a new form of economic and social development in the era of new industrial revolution. It constantly penetrates to energy industry, changes their operation and management styles. From manufacturing power to manufacturing powerhouse and building more world-famous 'Chinese brands', pushing China's economic development to enter the quality era, we need to cultivate many 'Chinese artisans', and we need to vigorously carry forward the craftsman spirit. Taking energy industry of China as an example, this paper explores the craftsmanship-cultivating strategies of modern apprenticeship trying to build a system of craftsmanship that is compatible with the energy industry' environment and the tendency of a big data. This will play a certain role in promoting the cultivation of artisans based on the modern apprenticeship and even the progress of China's energy industry [1-2].

2. Literature Review and Statement of Hypothesis

Artisans spirit refers to the individual in the professional field, treat the work of a kind of excellence, the pursuit of perfection and assiduously professional psychological quality, internal contain product excelsior professional value in what they do and into their own outlook on life and values, external performance for a noble professional ethics and social responsibility. The traditional craftsman spirit sense contains a way of moral quality and behaviour is good, excellence, persevering, and honour the teacher. With the development of the times, the "craftsman" in the era of networking can't just be busy building cars, but also have the spirit of innovation, through continuous entrepreneurship and innovation to meet the needs of users [3]. The carpenter's spirit consists of fine carving, excellence, doing the best products; also referring to the user experience, continuous innovation, subversion.

Based on literature review of craftsman spirit, its specific expression can be summarized as follows. So, we assume:

H1: The connotation of craftsman spirit is composed of five dimensions: psychological traits; technical skills; the responsibilities; energy immersion; innovation.
Ohler (2004) believed that individual work skill level would affect the vocational maturity. The more and more skilled an individual is, the higher the vocational maturity level will be. The craftsman spirit is built on the basis of work skills, so there is a correlation between the two. Yaping xie(2011) proposed the hypothesis that the career maturity will be affected by many factors, such as individual psychological factors, and individual characteristics and psychological qualities play an important role in the impact of career maturity[4]. The shaping of psychological quality and personality is a long-term process, which will be affected by families, societies and other aspects. It can be seen that research on career maturity and positive psychological quality is gradually deepening, and it is no longer limited to demographic variables, environment, family and other factors [5-6].

H2: Craftsman spirit has positive effects on vocational maturity.

Career maturity is the extent to which individual is ready for coping with career development tasks appropriate to his or her age. Betz et al.’s research shows that career decision-making self-efficacy has a significant predictive effect on career maturity. Wang Rongshan (2011) show that the career maturity and career values and career decision-making self-efficacy have significant correlation by introduction of professional values. Wen-xin du (2012) found career decision-making self-efficacy has positive prediction function on career maturity. From the existing research, it can be concluded that career decision-making self-efficacy can effectively promote individuals to improve the level of career maturity, and with the study of three factors, career decision-making self-efficacy can play an important role as an intermediary to career maturity.

So, we assume:

H3: career decision-making self-efficacy has positive effects on vocational maturity.

Hou Chunna, Wu Lin, Liu Zhijun (2013) pointed out that self-efficacy belief is the main dynamic mechanism of individual self-regulation and plays a key role in the relationship between proactive personality and occupational behavior participation (Hirschi, Lee, Porfeli, Vondracek, 2013), (Rogers, CreedGlendon, 2008; ParkerBindl, Strauss, 2010). Individuals with high active beliefs are more confident and have more positive attitudes, so they actively explore and improve the level of self-efficacy in career decision making. It can be seen that psychological factors play an important role in self-efficacy in career decision making.

So, we assume:

H4: The self-efficacy of career decision plays an intermediary role in the relationship between craftsman's spirit and career maturity.

3. Questionnaire Design and Data Collection

To ensure reliability and validity of research tools, this study adopts scale as used in the existing literature, and carries through appropriate modification in aim of present study.

510 questionnaires survey collected in energy industry have acquired data in groups and on-the-spot, of which 468 are retrieved. The research rejects the sample with not-answer item, obvious regularity of answers and from non-competitive industry, and then retains 456 valid samples. Variance analysis shows that the answers from different channels are no obvious difference and can be combined.

4. Reliability And Validity Analysis

To ensure reliability and validity of research tools, this study adopts scale as used in the existing literature, and carries through appropriate modification in aim of present study.

Career decision-making self-efficacy scale. The career decision-making self-efficacy scale for college students, compiled by Peng Yongxin and Long Lirong, has a total of 39 questions, including self-evaluation, information collection, goal selection, planning and problem solving.

Career maturity scale. Zhang Zhiqiang et al were used to revise the version of vocational maturity scale. The scale takes into account typical eastern cultural characteristics. The internal consistency coefficient is 0.8691, Guttman split-half coefficient is 0.8961. It is proved to have good validity. There are 34 items in the scale, including career target item, career confidence item, career value item, career
independence item, relative dependence item, and career reference item. In this study, we use Likert seven evaluation criteria to test the variables.

5. Reliability and Validity
The standardized coefficients of each observed variable are more than 0.70, the AVE value of each variable is than 0.5, and the square root of AVE variables are greater than the correlation coefficient of the variable with other variables, which indicates the variables have good introverted validity and discriminate validity.

6. Hypothesis Testing
The paper uses the LISREL 8.70 software for data analysis. We can read the results in table 1, table 2 and table 3.

Table 1. The second order factor analysis

| Variable                  | 1     | 2     | 3     | 4     |
|---------------------------|-------|-------|-------|-------|
| Psychological Traits      | 0.81  |       |       |       |
| Assuming                  | 0.39  |       |       |       |
| Responsibility            | 0.16  | 0.22  | 0.76  |       |
| Energy Immersion          | 0.26  | 0.41  | 0.49  | 0.79  |
| Continuous Innovation     |       |       |       |       |
| Cronch(α)                 | 0.89  | 0.94  | 0.93  | 0.91  |

6.1 A multi-dimensional structure of Craftsman spirit
From the results of confirmatory factor analysis, it can be seen that craftsman spirit is a multi-dimensional structure. From the basic content of craftsman spirit structure, craftsman spirit is a multi-dimensional four-factor model, which finally forms a formal questionnaire of craftsman spirit. The questionnaire consists of four dimensions: first, artisans’ skills. They have strict requirements on their own work and constantly improve their skills. Second, artisan innovation refers to the creative and constantly innovative work concept. On the basis of improving work methods, the pursuit of higher work efficiency and new work innovation points[11-3].

Table 2. Reliability and Validity Analysis

| Variable                  | 1     | 2     | 3     |
|---------------------------|-------|-------|-------|
| Craftsman spirit          | 0.79  |       |       |
| Career Decision-Making    | 0.34  |       | 0.86  |
| Self-Efficacy             |       | 0.31  | 0.19  | 0.73  |
| Career maturity           |       |       |       |
| Cronch(α)                 | 0.89  | 0.94  | 0.93  |

Table 3. The Results of Assumptions

| Variable                  | Assumption                          | Standard value | T value | Results |
|---------------------------|-------------------------------------|----------------|---------|---------|
| H1                        | Career Maturity ← Craftsman Spirit  | 0.76           | 0.92    | yes     |
| H2                        | Career Maturity ← Career Decision-Making | 0.67          | 1.81    | yes     |
| H3                        | Career Maturity ← the Self-Efficacy Of Career Decision * Craftsman Spirit  | 0.88           | 2.75    | yes     |
| Cronch(α)                 |                                     | 0.89           | 0.93    |         |

Chi-Square=132.45, df=81, RMSEA=0.052, NFI = 0.92, NNFI = 0.97, CFI = 0.96, IFI = 0.96, GFI= 0.90, AGFI = 0.85
6.2 A multi-dimensional correlation analysis

The correlation analysis shows that there is a significant positive correlation between craftsman spirit, career decision-making self-efficacy and career maturity. Further regression analysis shows that college students' craftsman psychology and career decision-making self-efficacy can effectively predict career maturity, and by constructing construction equation, it proves that career decision-making self-efficacy has a significant mediating effect between craftsman psychology and career maturity.

The results show that the self-efficacy of large career decision and career maturity are significantly positively correlated on the whole, indicating that the higher the self-efficacy of decision, the better the performance of career maturity, and the stronger the ability of students to make career decisions now or in the future. At the same time, the research shows that there is a significant negative correlation between the two dimensions of career decision-making self-efficacy and career maturity: occupational value and dependability of relatives and friends[14], indicating that occupational value and dependability of relatives and friends have a negative impact on career decision-making self-efficacy. On the one hand, the economic factors reflected in the occupational value will significantly affect the confidence of college students in their career decision-making process; on the other hand, the dependence on relatives and friends will have a side effect on college students' job-hunting. They need more opportunities and time to gain confidence in their independent job-hunting.

7. Conclusion and Discussion

Craftsman spirit is a multi-dimensional four-factor model: psychological traits, assuming responsibility, energy immersion, continuous innovation. Organizational craftsman spirit has significant positive effects on career maturity in energy enterprises. Career decision-making self-efficacy has significant positive effects on career maturity. Career decision-making self-efficacy from energy enterprise can not only effectively increase themselves assessment, but also promote the ability to solve problems. Further this research examines the relationships between organizational craftsman spirit and career mature and the moderator impact of career decision-making self-efficacy on craftsman spirit. Through the establishment of four hypotheses, it is concluded that organizational culture plays a part in mediating organizational maturity through the spirit of organizational craftsman.

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