



Research on the Influence of Intellectual Capital on Science and Technology Innovation Willingness of University Science and Engineering Teachers

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Abstract. Science and technology are the first productive force, and the contribution of university teachers is indispensable for promoting the construction of a strong science and technology nation. The enhancement of the willingness of university teachers to innovate in science and technology is increasingly significant in enhancing the comprehensive strength of universities and improving the scientific and technological strength of China. This study focuses on the role of intellectual capital in the context of “double first-class” science and technology universities and investigates its influence on the willingness of university teachers to innovate in science and technology, as well as its mechanism. By using intellectual capital as the independent variable and teachers’ willingness to innovate as the dependent variable, data were collected through a questionnaire and analyzed using SPSS 26.0 software.

Keywords: University Science and Engineering teachers · Science and Technology Innovation Willingness · Intellectual Capital · science and technology universities

1 Introduction

With the continuous progress and development of society, science and technology innovation has become an important force in driving social progress. As an important place for scientific and technological innovation, the enhancement of teachers’ willingness to innovate in science and technology plays a crucial role in promoting scientific and technological progress, economic development and social welfare. Therefore, how to stimulate and enhance the willingness of university teachers to innovate in science and technology has become one of the hot spots of current research. The purpose of this paper is to investigate the influence of intellectual capital on university teachers’ willingness to

Supported by ‘National Training Program of Innovation and Entrepreneurship for Undergraduates’, CUMTB: 202208008; ‘the Fundamental Research Funds for the Central Universities’, CUMTB: 202208008

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R. B. B. M. Hussain et al. (Eds.): ICHSSR 2023, ASSEHR 765, pp. 1674–1679, 2023.

https://doi.org/10.2991/978-2-38476-092-3_215

innovate in science and technology. In the current competitive knowledge-based economy, the importance of intellectual capital is increasingly prominent. At present, in the field of science and technology innovation of university teachers, there is still a lack of systematic and in-depth investigation on the specific influence mechanism of intellectual capital on teachers' willingness to innovate in science and technology.

Therefore, this paper focuses on the background of universities and combines empirical research methods to explore the influence of intellectual capital on the willingness of university teachers to innovate in science and technology. This paper aims to provide theoretical support and practical guidance for enhancing university teachers' willingness to innovate in science and technology, promoting science and technology innovation and fostering social progress. It is hoped that the findings of this paper will inspire and help university teachers in their science and technology innovation practices and related research work.

2 The Definition of Intellectual Capital and Research Hypothesis

2.1 The Definition of Intellectual Capital

Pierre Bourdieu [1] first put forward the concept of "social capital", defined it as a persistent network formed by mutual acquiescence or recognition, which is an actual or potential collection of resources. Coleman J [2] and Ptnam [3], extending on this basis, we think that social capital is a kind of behavior ability for collective interests, including three dimensions of social trust, social norms, and social network, which can promote cooperation and improve the effectiveness of society. In summary, the close relationship between social capital and social relations, social resource exchange, is the focus of attention in the study of social capital. This paper defines social capital as individual or social capital based on the sum of actual and potential resources embedded in the relationship network owned and available, social capital is divided into structural, relational and cognitive dimensions to carry out relevant research.

2.2 Research Hypothesis

Because of the close relationship between intellectual capital and science and technology innovation, there is no shortage of scholars who have studied the relationship between the two from different perspectives, but the research on the relationship between intellectual capital and science and technology innovation has mainly focused on the direct and indirect influence of intellectual capital on science and technology innovation in various social groups (except universities). In the context of the construction of "double-class" universities and the construction of a strong science and technology nation, this direction is likely to become the focus of future research. In the context of the construction of "double first-class" universities and the building of a strong science and technology nation, this direction is likely to be the focus of future research. Ugur Ozalp and Munevver Cetin's study [3] provides a reliable reliability scale for academic organisations, which are important for innovative organisations.

Based on the above analysis, this paper proposes the following hypothesis: Intellectual capital in higher education has a positive effect on teachers' willingness to innovate in science and technology.

Table 1. Results of relevance analysis

Variable	average value	Standard deviation	1	2
1.Intellectual Capital	3.8612	0.69009	1	
2.Willingness to innovate in science and technology	4.2211	0.61652	0.611**	1

3 Empirical Analysis

3.1 Measurement of Variables

To ensure the scientific validity of the measurement of the relevant variables in this study, the questionnaire was mainly adapted from well-established scales in the relevant domestic and international literature. The Intellectual Capital Scale was adapted from the study by Özalp et al. [4], with 22 items, while the Intention to Innovate Scale was adapted from the Innovation Motivation Scale created by Tierney et al., translated by Pan Jingzhou et al. [5], and adapted locally, with 10 items. The Likert 5-point scale was used for all measurements.

3.2 Data Collection

This paper adopts a questionnaire method to collect data. Prior to the mass distribution of the questionnaire, a number of university science and technology teachers from different schools were invited to test-fill the questionnaire and correct the expressions of ambiguous questions. The final questionnaire was then distributed in a double-class science and engineering university to teachers with different titles, including professor, associate professor, lecturer and assistant professor. A total of 243 questionnaires were obtained, and after screening based on the length of time taken to complete the survey and the screening pitfalls, the final valid questionnaire was 224. Descriptive statistics and correlation analysis.

3.3 Relevance Analysis

This paper uses SPSS 26.0 to conduct correlation analysis of quantitative indicators, as shown in Table 1.

The results from Table 1 show that intellectual capital is significantly and positively correlated with college teachers' willingness to innovate in science and technology ($r = 0.611$, $p < 0.01$). Hypothesis: the positive effect of intellectual capital in universities on the willingness of university teachers to innovate in science and technology holds.

3.4 Regression Analysis

After the regression analysis of the influence relationship between the variables, the existence of a significant influence relationship between the variables and the strength

Table 2. Results of regression analysis

Path	Unstandardized coefficient	Standardized coefficient	S.E.	P
Intellectual capital → Willingness to innovate in science and technology	0.293	0.403	0.081	***

of the relationship were obtained, as shown in Table 2. From the table, it is found that the unstandardised coefficient of intellectual capital in universities and willingness to innovate in science and technology is 0.293 and the standardised coefficient is 0.403, and the positive relationship between the two is significant. In other words, the intellectual capital of universities has a significant positive influence on the willingness of university teachers to innovate in science and technology.

4 Conclusions and Suggestions

4.1 Conclusions

Based on the relevant literature, this study focuses on the influence of intellectual capital on the willingness to innovate in the university context and explores the relationship between intellectual capital in universities and the willingness of teachers to innovate in science and technology, and obtains the following findings: the positive influence of intellectual capital in universities on teachers' willingness to innovate in science and technology is significant. (The unstandardised path coefficient is 0.293.) The coefficients of the observed variables "IC13: Our school has an e-learning platform that can meet the needs" and "IC21: Our teachers are known for their unique and creative ideas" are the largest, at 1.62 and 1.62 respectively. This indicates that the more advanced and convenient the learning and communication platform provided by the university and the more innovative the team of teachers is, the stronger the willingness of teachers to innovate in science and technology. While previous studies have verified the positive impact of intellectual capital on innovation performance and innovation effectiveness in universities, this study focuses on the subjective aspect of willingness to innovate, which is a useful addition to related studies. Factors such as the optimisation of hardware facilities and the level of professional discipline construction in the university, the knowledge acquisition and technological research and development capabilities of the surrounding faculty and students, and the support of the government and partner enterprises and institutions for technological innovation have an important influence on whether teachers are willing to innovate in science and technology.

4.2 Suggestions

The quality and quantity of peers that teachers have access to can influence their innovation potential and willingness to compete, while good relations with science and

innovation-related enterprises can directly influence the introduction of hardware facilities and the quality and quantity of partners that teachers have access to. Therefore, in order to enhance the willingness of university teachers to innovate in science and technology from the intellectual capital of universities, this paper puts forward the following suggestions:

First, increase the investment in scientific research funds and improve the construction of infrastructure. On the one hand, we call on the government to increase the investment in universities; on the other hand, universities themselves should increase the investment in research and development funds, and universities can form an effective combination of “industry, university and research” by strengthening the cooperation with enterprises, and solve the problem of investment in science and technology through the market and enterprises [6]. At the same time, we should pay attention to building an international science and technology exchange platform to provide a diversified environment for science and technology innovation to blossom.

Secondly, adequate resource sharing is the basis for guaranteeing the orderly construction of science and technology teachers’ teams. The effective use of intellectual capital has significant significance for the integration and distribution of important resources such as scientific research funds, infrastructure, scientific research talents, scientific and technological resources and scientific research projects, and universities can gradually build from the dimensions of characteristic and advantageous majors, first-class teachers, industry upstream and downstream industrial chains, other industries, universities and government resources, etc. The integrated teaching resources network can effectively concentrate the human, material, financial, knowledge, information and technology resources needed for the operation of teaching teams, and improve the efficiency of resource utilization of science and technology teachers’ teams.

Thirdly, the construction of science and technology teachers’ teams needs to be carried out through certain professional construction and teaching reform projects, which is the key to achieving high-quality teaching results and nurturing effectiveness. Universities should take the initiative to dovetail with the industrial chain and organically combine different disciplines and majors inside and outside the university according to the principles of similar, related or complementary engineering objects, technical fields and disciplinary bases. In the process of building teaching teams, universities should not only establish a team cooperation mechanism to improve teachers’ educational and teaching abilities and overall teaching level, but also create conditions to support teachers to carry out collaborative education and industry-university-research cooperation activities.

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