



# Review and Prospect of Human Capital Research Based on Knowledge Mapping

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**Abstract.** Human capital is a multi-level concept, and the research content is fragmented. 357 documents on human capital are taken from the core database of Web of Science from 1999 to 2022 as research samples to analyze from the following aspects: annual distribution, periodical distribution and keyword cluster analysis. Based on the above analysis, this study points out that future research can be expanded from the following three aspects: research theme, research methods and measurement methods.

**Keywords:** human capital · bibliometrics · knowledge mapping

## 1 Introduction

Human capital is the foundation of scientific and technological innovation and economic growth. For enterprises, human capital resources are valuable, rare, inimitable and non-substitutable, which is the source of sustainable competitive advantage for organizations. For individuals, human capital is the key to success. Therefore, human capital gradually attracts the attention of managers and scholars.

The idea of human capital originates in the field of economics. Schultz (1961) pointed out that knowledge and skills acquired by people are products of investment [1]. However, researchers in the field of economics focus on how individuals make choices in human capital investment. Barney's (1991) seminal article inspires scholars to regard human capital as a resource at the organization level, and promotes the study of human capital in the field of organization [2]. With the deepening of research, scholars have come to realize that human capital is a multi-level concept, and knowledge, skills, abilities and other characteristics (KSAOs) are widely accepted as the components of human capital [3]. Existing researches on human capital deal with organizational, team, and individual levels, and the research content presents the characteristics of fragmentation. In view of this, with the help of visualization software Citespace, this study conducts a visual analysis of the studies of human capital in the field of organization. By sorting out the research topics of human capital research over the past 30 years, this study builds a multi-level integrated human capital research framework and predicts future research directions, in order to provide reference for subsequent researchers.

## 2 Data Source and Research Methods

### 2.1 Data Source

This study focuses on the researches of human capital in the field of organizations. The research samples of individual, team and organizational human capital published in important international journals are mainly derived from the core collection database of Web of Science. The core collection database of Web of Science is searched on the subject of “human capital”, and the search conditions involved are as follows: literature type (paper, review paper, online publication), category (management), language (English), and retrieval time (September 16, 2022). A total of 1142 studies are obtained. Through further screening and de-weighting, a total of 357 studies are obtained.

### 2.2 Research Methods

In this study, knowledge graph method and literature induction method are combined, and Citespace software is used for visualization analysis. Citespace software is used to analyze the annual distribution, periodical distribution and keyword cluster analysis of studies of human capital, which intuitively shows the basic status quo of this field and clarifies the research topic.

## 3 Research Overview

### 3.1 Annual Distribution

The annual distribution of human capital literatures in the field of organization in international journals is shown in Fig. 1. As can be seen from Fig. 1, studies on human capital in the field of organization gradually emerged in international journals at the end of the 20th century. From 2001 to 2009, it is the initial stage of development, and the number of published articles is in the single digits every year. Since 2010, the number of publications has increased to more than 10 every year, reaching a record high of 41 in 2021.

### 3.2 Periodical Distribution

The top 10 international journals in terms of the number of published studies of human capital in the field of organization from 1999 to 2022 are: International Journal of Human Resource Management(43), Journal of Intellectual Capital(37), Strategic Management Journal(21), Journal of Management(20), Personnel Review(18), Management Decision(15), Human Resource Management(12), Small Business Economics(12), Journal of Applied Psychology(12), Human Resource Management Review(8).

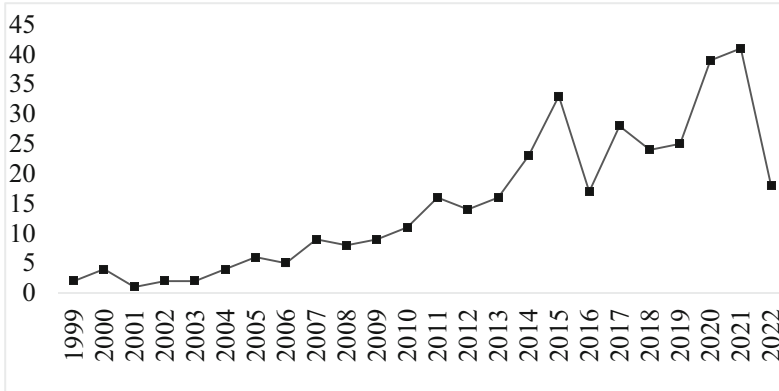


Fig. 1. Annual distribution of the sample literature. Data Source: Collected by this study.

## 4 Research Topic Analysis

In this study, Citespace software is used for keyword cluster analysis, and the results are shown in Fig. 2. In summary, the research level of human capital includes individual, team and organization. The research topics are divided into three categories: the relationship between human capital and other capital, antecedent variables of human capital and outcome variables of human capital. Based on this, a multi-level research framework of human capital is constructed.

### 4.1 The Relationship Between Human Capital and Other Capital

As the clustering label “intellectual capital” and “social capital” shown, some researchers compared the relationship between human capital and other capital. Human capital is an important part of intellectual capital. The structure of intellectual capital includes duality structure, triplex structure and multivariate structure, and most researchers divide it into triplex structure [4], namely human capital, structural capital and relational capital.

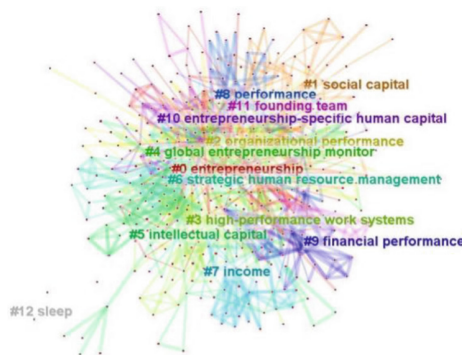


Fig. 2. Keywords clustering map. Data Source: Collected by this study.

## 4.2 Antecedent Variables of Human Capital

Human capital is mainly affected by individuals and organizations. Based on this, this study divides the antecedent variables of human capital into individual factors and organizational factors.

In terms of individual factors, the formation and development of human capital are influenced by individual positive mental states and characteristics. Hsiao et al. (2016) found that human capital mediates the relationship between internal locus of control and entrepreneurship [5].

As far as organizational factors are concerned, organizational structure and human resource management have an impact on human capital. In terms of organizational structure, Li et al. (2021) pointed out that age diversity positively affects organizational human capital [6]. As the clustering label “high performance work system” shows, human resource management practice is an important factor affecting human capital. Jiang et al. (2012) used meta-analysis to find that skills-enhanced, motivation-enhanced and opportunity-enhanced human resource management practices positively influence organizational human capital [7]. Some scholars found that high performance work system at the organizational level can improve human capital at the team level through cross-level analysis [8].

## 4.3 Outcome Variables of Human Capital

This study combs the outcome variables of human capital from three aspects: individual, team and organization.

### Individual Level

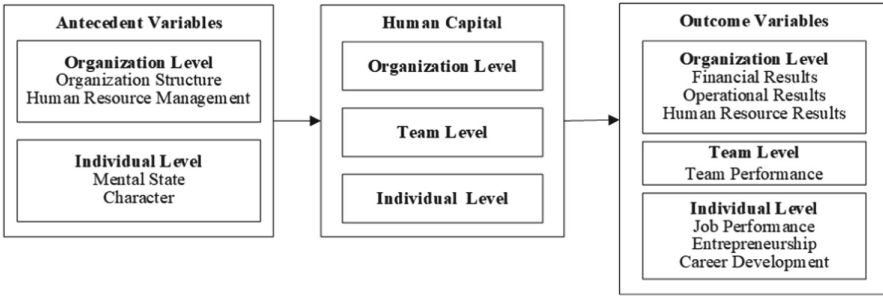
The outcome variables at the individual level can be summarized into three aspects: job performance, entrepreneurship and career development. Firstly, a large number of studies have confirmed that human capital can improve job performance [9]. Secondly, as can be seen from the cluster labels “entrepreneurship” and “entrepreneurship-specific human capital”, human capital is a hot topic in the field of entrepreneurship. Researchers found that entrepreneurs with higher levels of human capital are more likely to identify entrepreneurial opportunities, obtain resources, and achieve entrepreneurial success [10]. Thirdly, current researches explore the impact of human capital on career success. Compared with subjective career success, human capital can more positively predict objective career success [11].

### Team Level

Currently, there are relatively few outcome variables at the team level. Similar to individual level, performance is also an important outcome variable of team human capital. However, Eckardt et al. (2021) found that the relationship between team human capital and performance is stronger than that between individual human capital and performance due to the existence of synergistic effect [12].

### Organization Level

According to Jiang et al. (2012), the organizational outcome variables are divided into



**Fig. 3.** Multi-level research framework for human capital. Data Source: Collected by this study according to relevant researches.

financial results, operational results and human resources results [7]. In terms of financial results, Hsu and Wang (2010) found that organizational human capital affects performance (return on assets) through dynamic capabilities [13]. In terms of operational results, Sun et al. (2020) found that organizational human capital affects innovation performance through learning ability [14]. As for the human resources results, there are relatively few studies. Existing studies have shown that human capital can improve knowledge sharing [15] and reduce voluntary turnover [7] (Fig. 3).

### 5 Conclusions

Some results are obtained: (1) In terms of annual distribution, the research craze continues to grow. (2) In terms of journals, the International Journal of Human Resource Management has the highest number of publications on human capital in the field of organizations. (3)According to the keyword cluster analysis, the research topics are divided into three categories: the relationship between human capital and other capital, antecedent variables of human capital and outcome variables of human capital. The research content of human capital involves organizations, teams, individuals and other levels, and its antecedents variables and outcome variables have been discussed a lot. However, there are still many research gaps in the research of human capital. We believe that researchers can continue to carry out systematic and in-depth research on human capital from the following aspects in the future.

In terms of research methods, the multi-hierarchical regression analysis can be used in future research to examine cross-level effects. As far as measurement methods, the measurement of human capital by scholars can be divided into two types: objective measurement and subjective measurement. One is to use education, tenure and other human capital input indicators to measure. Although this method can get rid of subjective restrictions, it cannot accurately reflect the knowledge, skills and abilities owned by an individual. The other is to use the scale to measure human capital. Subjective measurement is based on the perception of a respondent, and there may be common methodology bias, assessment bias, inaccurate reporting and other problems. Future researchers can combine objective measurement and subjective measurement to measure human capital. In terms of research topic, future research can continue to deepen

the discussion of antecedent variables and outcome variables. For example, researchers can discuss which leadership style will affect the formation and development of human capital and whether human capital brings negative effects.

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