

An Optimization Method for Evaluating Influence of Psychological Contract on College Teachers Based on Data Mining Algorithm

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Abstract

Data mining algorithm can effectively extract the key information, and help enterprises and researchers to make comparative analysis. In this paper, the author makes an optimization method for evaluating influence of psychological contract on college teachers based on data mining algorithm. The study of psychological contract of university teachers can adapt to the needs of modern higher education management reform, mobilize the enthusiasm of university teachers to the maximum extent, and enhance the level of work performance of university teachers. On this basis, the author puts forward the corresponding countermeasures to improve the performance of university teachers.

Keywords: Data mining algorithm, Psychological contract, Big data, Empirical analysis

1. INTRODUCTION

With the acceleration of the popularization of higher education in our country, the influence and function of colleges and universities on the whole society are becoming more and more significant. Under the market economy system, the competition is becoming more and more serious, and colleges and universities are faced with the severe test of the survival of the fittest. In order to meet the needs of the management reform of modern higher education, work enthusiasm to maximize the mobilization of College Teachers' job performance, to enhance the level of university teachers in Colleges and universities, especially the factors of university managers began to investigate the influence of College Teachers' job performance. However, influenced by the traditional ideological and cultural background, most college teachers' job performance in the actual management process still prefer the traditional mode of management, and not from the University Teachers' psychological needs to develop to meet their psychological expectations incentive measures. This not only can not improve the performance of teachers, but also more deviated from the growing psychological needs of teachers, and ultimately affect the overall level of the University and enhance competitiveness. Under the new situation that talents are gradually separated from organizations and can be freely configured according to the market, colleges and universities are faced with the severe challenge of how to attract and retain excellent teachers. Psychological contract is an invisible contract, which is conducive to the formation of organizational cohesion and team atmosphere, and also affects the performance of college teachers and the turnover rate of teachers, thus ultimately affecting the realization of strategic goals of colleges and universities. Therefore, in this paper, the theoretical basis of the existing exploratory analysis of College Teachers' psychological contract dimensions and job performance dimensions, aims to explore the influence of psychological contract on College Teachers' job performance, strategies and suggestions so that performance of the corresponding work to improve college teachers.

The traditional ways to improve the performance of college teachers mainly tend to the material aspects, but less involve the teachers' inner feelings. However, with the changes of the times, people's psychological needs also rise from the tangible material needs to the invisible psychological needs. Therefore, from the psychological needs of college teachers, the incentive strategy to meet their psychological needs is proposed, which, to some extent, makes up for the singleness of College Teachers' material motivation. The psychological contract was first proposed by Chris Argyris, he used this concept to describe the psychological contract between the supervisor and subordinate relationship, the specific performance if the organization take positive and effective leadership, the staff will be in an optimistic way to respond to the behavior, if the organization fully respect the norms of individual cultural informal employees, employees for less complaining, and maintain high enthusiasm, maintain high productivity. However, he did not define the psychological contract clearly and did not define the scope of the psychological contract. Colleges and universities should focus on the initial education, teachers pay attention to teachers' expectations, improve teachers' satisfaction and occupation career planning strategies to strengthen the teacher's construction of psychological contract based on the performance management system.

Positive psychology is concerned with the study of psychological problems in the field of psychology, and advocate psychology in addition to the positive qualities of human psychology (Pereira, 2015). The traditional organization behavior learned many research organization, team and staff of the existence of problems, ignore their untapped advantages; rely on to supervise and punish employees to correct their behavior, not the affirmation and praise to motivate their performance. It is positive that the positive organizational behavior,

positive organizational behavior put forward a positive research perspective, positive psychology on optimism, hope, subjective well-being and other positive emotions into their system. Positive organizational behavior science positive organizational behavior (POB), the concept of research should not only associated with enthusiasm, and must be with the traditional organizational behavior concepts are different, in the research methods, POB also borrows heavily from the psychology of observation, experiment and measurement technology, especially the use of a longitudinal study of, the most important is positive organizational behavior is on the basis of positive psychology can be widely used in the practice of management, for employees and managers of development training, and ultimately achieve the goal of improving organizational performance. Therefore, it can be developed; trained and improved performance is the key to distinguish between positive organizational behavior and positive psychology, the traditional orientation of organizational behavior.

2. DATA MINING THEORY

2.1. Data mining

According to the database model, data mining is divided into data mining based on relational database and data mining based on the object oriented database. Along with the development of the database technology, the data mining of the multimedia database, the data mining of temporal database and the data mining of spatial database have attracted the attention of many people. The task of data mining is mainly related to the correlation analysis, cluster analysis, classification, prediction, time series model and deviation analysis. The methods of data mining can be divided into statistical methods, machine learning methods and neural network methods. Among the numerous methods of data mining, association rules have been the research focus of many scholars. Mining association rules including uncertainty of association rules mining, uncertain association rules mining quantitative association rules mining, incremental association rules mining, fuzzy association rules of mining generalized association rules mining. The purpose of association rule mining is to find the relationship among the items in the database.

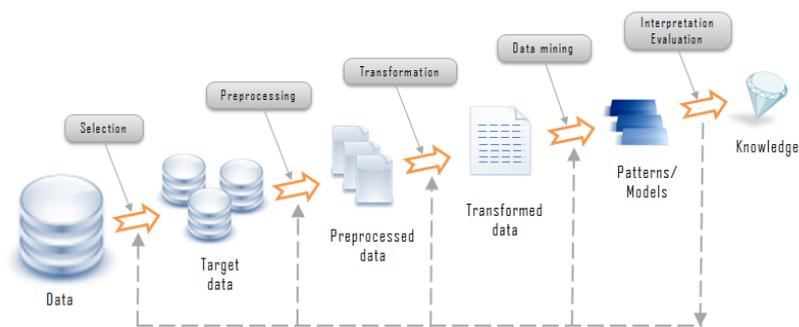


Figure 1. Databases Knowledge-Discovery, KDD

2.2. Structural risk minimization

Massive data and poor knowledge led to the emergence of data mining and knowledge discovery. Knowledge discovery is a non-trivial process of identifying valid, novel, potentially useful, and ultimately understandable patterns from the data. Now the knowledge discovery mainly has two branches, respectively are the database knowledge discovery and the literature based knowledge discovery. The methods of knowledge discovery are divided into statistical methods, machine learning methods and neural computing methods. Besides the methods of regression analysis, discriminant analysis, cluster analysis and exploratory analysis, it also includes fuzzy set method, support vector machine method, rough set and so on. Commonly used machine learning methods include rule induction, decision tree, case based reasoning, genetic algorithm, etc.. Common neural computing methods include self-organizing map network, back propagation network and so on. In the linear separable model, classification of SVM in an H inner space structure for super plane:

$$\langle w, x \rangle + b = 0, \quad w \in H, b \in R \quad (1)$$

The formula corresponds to the decision function:

$$f(x) = \text{sgn} \langle w, x \rangle + b \quad (2)$$

For linearly separable sets of samples, the total can be adjusted by w and b:

$$\langle w, x \rangle + b \geq 1, y = 1$$

$$\langle w, x \rangle + b \leq -1, y = -1$$

Obviously, this adjustment does not change the discriminant function 2. Define two standard canonical hyper planes as:

$$\langle w, x \rangle + b = 1 \quad \text{and} \quad \langle w, x \rangle + b = -1$$

The sample points on the two standard hyper planes are called support vectors, and the name of the support vector machine is obtained. Define the classification interval (margin) as:

$$\rho = 2r = \frac{2}{\|w\|} \tag{3}$$

As a result, the optimization problem for linearly separable SVM is:

$$\min J(w, b) = \frac{1}{2} \|w\|^2 \tag{4}$$

The above problem is the main problem of SVM, which is a convex two optimization problem. The problem can be solved by constructing the Lagrange multiplier method to solve the problem.

$$\begin{aligned} \max W(\alpha) &= \sum_{j=1}^l \alpha_j - \frac{1}{2} \sum_{i,j=1}^l \alpha_i \alpha_j y_i y_j x_i x_j \\ &\sum_{j=1}^l \alpha_j y_j = 0 \end{aligned}$$

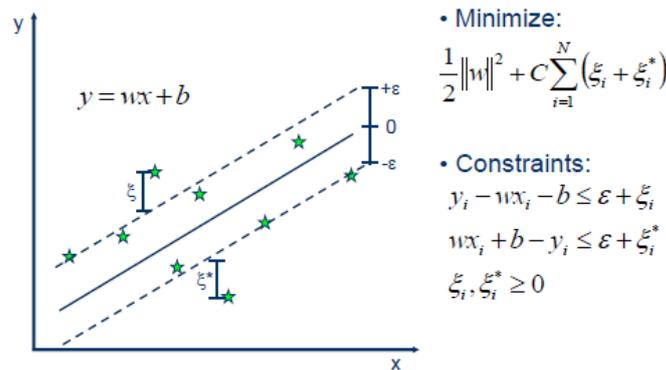


Figure 2. SVM classification

3. EMPIRICAL ANALYSIS

3.1. Research object

Performance measurement of existing research is more through the sales performance, supervision and evaluation and performance in the performance of the task performance and contextual performance. With the continuous development of society, learning performance and innovative performance has become a new perspective of individual job performance. The transformation from the traditional performance evaluation to the learning organization and the innovation organization is the new content of the social development. At present, the domestic and foreign research more to workers or employees as samples, less to teachers as the research object, usually the psychological capital as a whole, or use some dimensions. However, existing mature scale mostly developed in the western context, although it has high reliability and validity, but used directly in China not necessarily appropriate. Therefore, this study tries to study the positive effects of psychological capital in China. This study takes college teachers as an example. In teachers psychological survey sample 5500 randomly selected 8% samples of 440 people do empirical analysis and fitting structural equation model, which retains the total sample of psychological crisis of all the information.

3.2. Research methods

Psychological capital test tool: There are 24 indicators of the scale. On the basis of Luthans psychological capital questionnaire edited "psychological capital questionnaire" SPCQ, a total of 20, including four factors (confidence / self-efficacy, hope, optimistic, toughness, in order to make as an intermediate variable.

Life stress test: Using American psychologist gadzella compilation of teacher life stress questionnaire (SLSI). It detected college teachers nearly three months to the life stressor (frustration, conflicts and pressure changes, self-imposed) and stress response. Scoring standard: 1= never, 2= few,3= medium,4= often,5= always.

Psychological crisis test: Psychological crisis for synthetic variables, including five dimensions: symptoms of depression (depression diagnosis standard 9), the pain of despair (negative and pessimistic, painful experience, useless despair, suicide risk (a year to "want to commit suicide, three months to" attempt to commit suicide ", a month" are repeated to die idea ")), impairment (life, learning and communication function are damaged), avoidance of aid (the lack of support, mentioning the crisis and willing to resort to). These indicators are derived from related psychological tests.

4. RESULTS AND ANALYSIS

4.1. The interactive effect of psychological capital

We use AOMS software and fit the X independent variables (stress), M mediated variable (psychological capital), Y dependent variables (psychological crisis) structural equation model (SEM), and do the prediction analysis. Taking the interaction of College Teachers' psychological capital 4 factors as independent variables (self-confidence * hope * toughness * optimistic), with its life stressor for the dependent variable, the multiple parameter estimation of regression analysis. The results showed that: "confidence * * want * toughness * optimistic" interaction respectively to life stressors that setback, pressure and changes have a significant negative effect and the relief of effect ($P < 0.05$), but to conflict and self-imposed does not produce significant effect ($P > 0.05$).

Table 1. The influence of optimism and pessimism on the life stress

Dependent Variable	B	S.E	T value	P value	95% confidence interval	
X1 frustration	17.129 -1.87E-005	.511 .000	35.563 -4.231	.000 .000	17.125 -2.45E-005	19.114 -1.29E-005
X2 conflict	7.205 -1.54E-006	.273 .000	26.205 -4.62	.000 .350	6.189 -6.15E-006	7.351 2.14E-006
X3 pressure	13.250 -1.30E-005	.356 .000	33.175 -3.651	.000 .000	12.654 -1.35E-005	13.753 -6.04E-006
X4 changes	8.985 -9.81E-006	.286 .000	31.753 -4.248	.000 .000	8.456 -1.76E-005	9.987 -5.47E-006
X5 self-strengthening	18.354 -4.74E-006	.428 .000	43.159 -1.094	.000 .274	17.987 -1.38E-005	19.123 3.68E-006

Taking the interaction of College Teachers' psychological capital 4 factors as independent variables (self-confidence * hope * toughness * optimistic), dependent variable, the multiple parameter estimation of regression analysis. The results showed that: "confidence * * want * toughness * optimistic" interaction respectively on psychological crisis and depression symptoms, pain and despair, suicide risk, impaired function, avoidance assistance dimensions have significant negative effects of the intervention ($P < 0.05$) effect to the psychological crisis and its five dimensions.

Table 2. Interaction effect of psychological crisis

Dependent Variable	B	S.E	T value	P value	95% confidence interval	
Y1 depressive symptoms	3.753- 1.48E-005	.269 .000	14.452 -6.549	.000 .000	3.453 -1.92E-005	4.463 -1.03E-005
Y2 pain and despair	.951 -3.89E-006	.104 .000	8.652 -4.461	.000 .000	.745 -5.61E-006	1.562 -2.18E-006
Y3 suicide index	.321 -1.11E-006	.057 .000	4.458 -2.312	.000 .021	.126 -2.06E-006	.376 -1.67E-007
Y4 Impaired function	.425 -1.92E-006	.080 .000	7.658 -2.878	.000 .004	.437 -3.24E-006	.726 -6.10E-007
Y5 avoidance assistance	9.145 -5.25E-006	.252 .000	35.452 -2.479	.000 .014	8.652 -9.41E-006	9.638 -1.09E-006

<i>Y psychological crisis</i>	14.654 -2.69E-005	.550 .000	26.753 -5.844	.000 .000	13.124 -3.60E-005	15.427 -1.79E-005
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4.2. The mediation effect analysis

Fit the structural equation model of X life stress - M psychological capital - Y psychological crisis, the results show that: (1) the psychological capital to life stress produced significant mitigation effects of -0.34 (P < 0.001); (2) psychological capital on the psychological crisis produced a significant intervention effect -0.41 (P < 0.001), and in mediating effect model enhanced on the psychological crisis intervention effect than in the context of independent effect of intervention effect -0.17 increased 2.4 times); (3) life stress on psychological crisis directly caused by the effect of 0.71, through psychological capital of two-way adjustment (to stress relieving effect of 0.37 and crisis intervention effect -0.41) produced a significant mediating effect of 0.15 (-0.37* - 0.41), than life stress induced effect 0.71 reduced 4.7 times. It can be seen that psychological capital can not only relieve the stress of life, but also interfere with the psychological crisis. It has a significant mediating effect between stress and crisis (p<0.01). After the goodness of fit test, the mediating effect model 2 is better than the direct effect model 1.

Table 3. The test of goodness of fit

Model	NPAR	CMIN	DF	P	CMIN/DF	NFI	IFI	CFI	RMSEA
<i>Model 1</i>	44	324.982	75	.000	5.014	.816	.873	.846	.038
<i>Model 2</i>	44	263.986	75	.000	2.938	0.864	.913	.935	.035

Table 4. Standard effect valuation for path analysis of each variable

	Model 1			Model 2		
	X life stress	M psychological capital	Y psychological crisis	X life stress	M psychological capital	Y psychological crisis
<i>X1 frustration</i>	.875			.813		
<i>X2 conflict</i>	.626			.633		
<i>X3 pressure</i>	.793			.721		
<i>X4 changes</i>	.746			.728		
<i>X5 self-strengthening</i>	.224			.509		
<i>M psychological capital</i>				-.366		
<i>M1 confidence</i>		.634		-.245	.656	
<i>M2 hope</i>		.568		-.207	.578	
<i>M3 toughness</i>		.743		-.268	.736	
<i>M4 optimistic</i>		.527		-.189	.528	
<i>Y psychological crisis</i>	.786	-.138		.151	-.425	
<i>Y1 depressive symptoms</i>	.533	-.101	.769	.118	-.376	.756
<i>Y2 pain and despair</i>	.501	-.146	.799	.134	-.325	.812
<i>Y3 suicide index</i>	.473	-.146	.646	.086	-.283	.648
<i>Y4 Impaired function</i>	.447	-.138	.637	.075	-.235	.615
<i>Y5 avoidance assistance</i>	.234	-.050	.289	.046	-.178	.311

Table 5. Regression Weights Estimates

Variable relation	B	S.E.	Beta	T value	P value
<i>X1 frustration ← life stress</i>	.802	1.475	.085	14.753	***
<i>X2 conflict ← life stress</i>	.607	.515	.154	12.652	***
<i>X3 stress ← life stress</i>	.714	1.000			***
<i>X4 changes ← life stress</i>	.725	.712	.048	13.258	***
<i>X5 self-strengthening ← life stress</i>	.511	.758	.069	9.652	***
<i>M psychological capital ← life stress</i>	-.354	-.269	.057	-5.785	***
<i>M1 confident ← psychol. capital</i>	.665	.907	.079	10.369	***
<i>M2 hopes ← psychol. capital</i>	.570	.706	.065	9.456	***
<i>M3 resilience ← psychol. capital</i>	.728	1.05			***
<i>M4 optimistic ← psychol. capital</i>	.520	.746	.075	9.145	***
<i>Y psychological crisis ← psychol. capital</i>	-.425	-.415	.063	-6.128	***
<i>Y1 depression symptoms ← psychol. crisis</i>	.717	1.04			***

<i>Y2 pain and despair ← psychol. crisis</i>	.816	.375	.018	15.459	***
<i>Y3 suicide index ← psychol. crisis</i>	.646	.168	.015	13.268	***
<i>Y4 function impaired ← psychol. crisis</i>	.617	.215	.017	12.346	***
<i>Y5 avoidance assistance ← psychol. crisis</i>	.311	.354	.046	6.026	***

5. DISCUSSION AND SUGGESTION

5.1. Psychological capital has a positive effect on the education and management

Through theoretical and practical analysis, college teachers who have high self-confidence, optimism, hope and toughness, effectively transforming life stressors, through self-adjustment to achieve self-balancing and psychological crisis intervention. To improve the psychological capital of college teachers, to control and reduce the generation of psychological crisis sources, to correctly understand and cultivate scientific coping style, to reduce the occurrence of life stress. College teachers feel the main source of stress is pressure changes, self imposed and other variables, this is because after entering the University, compared with their life and learning in high school, facing a series of changes, these changes to them is stressful events. Stress is one of the important factors that affect the psychological crisis. The improvement of psychological capital has a significant effect on the intervention of the psychological crisis of college teachers. It shows that the higher the score of psychological capital, the higher the positive mental energy, the higher the level of psychological crisis. The research shows that the more stress the college teachers encounter in life, the worse the individual's ability to cope with, the more intense the stress response caused by the physiological, emotional and behavioral. Teachers in learning and life and so on, facing a series of changes, a lot of setbacks, difficulties, resulting in psychological conflict and conflict, causing psychological crisis. Therefore, it is effective to reduce the level of teachers' psychological crisis through the intervention of psychological capital. In this study, we also draw the conclusion that psychological capital has a significant effect on psychological crisis.

College Teachers' psychological capital to toughness and confidence as the core; the psychological capital and regression coefficients showed that, toughness is 0.73, self-confidence is 0.67 to 0.57, 0.52 optimistic. The resilience and hope for higher weight, according to the regression coefficient of the college teachers' psychological capital. In life stress, frustration, change and pressure is mainly caused by the core causes of College Teachers' psychological crisis. The regression coefficients showed that, frustration 0.81, conflict 0.63, pressure 0.72, changes 0.73, self-reinforcing 0.51, which setbacks, and the pressure variation accounted for weight higher. Depression, depression and despair are the most common form of college teachers in the psychological crisis. The regression coefficient showed that depression symptoms 0.78, pain and despair 0.80, suicide index 0.66, the function was impaired 0.62, avoid the assistance of 0.31, in which the depression symptoms and the pain of despair, the weight is higher. Through the analysis of the internal and core factors of psychological capital, life stress and psychological crisis, it can provide the objective basis for the intervention of psychological crisis of college teachers.

5.2. Strengthen the positive management strategy of psychological capital

Paying attention to the development and cultivation of psychological capital of university teachers has a very important influence on their future study and work development. College teachers through the establishment of social relations, including family members, friends or teachers of good relations, to effectively combat the insecurity and helplessness of college teachers, improve their resistance to stress and frustration. Pay attention to the cultivation of college teachers around the positive view of things, to maintain their optimistic spirit, strong sense of values, will make college teachers self-trust to strengthen, play a role in the impact of crisis intervention. To enhance college teachers' hope for reality and the future, to guide college teachers to pursue their goals with a positive attitude, this is an effective way to transform the psychological crisis.

- Develop confidence: Excellent academic performance, a wide range of interpersonal communication; a certain position training and role model; appropriate physiological and psychological arousal is the three aspects of the impact of self-confidence. Therefore, the contemporary college teachers, to improve self-confidence and self-efficacy, must have a correct self-consciousness, keep the attitude of seeking truth from facts, self-respect, self-confidence, self-reliance, and maintain an optimistic and positive healthy mentality. Face up to their own situation, the courage to accept their own, through appropriate social practice, community and a variety of collective activities and social welfare activities to increase self-efficacy.

- Develop hope: Want to be influenced by goals, paths, and motives. Specifically, it is the goal of college teachers to develop their own learning and future planning; the goal should be a reasonable challenge and a clear point of time. Also will set the goal is to refine the classification, to determine a target and plan accordingly; find happiness in achieving objectives, rather than just focus on results; in the face of difficulties insist do not give up; when the target appears not feasible or resistance, how to adopt appropriate methods to solve; these are the factor of the development strategy for college teachers' psychological capital hopeful. In addition, in the face of learning pressure, employment pressure and responsibility, especially in the face of the current grim

employment situation, college teachers should make full use of their knowledge of the network, actively preparing for the venture, believe that the future is promising, on the future living conditions have great confidence in the.

- Develop optimism: In the process of setting up the path and overcoming the obstacles, the self-efficacy of the gradual cultivation has laid the foundation for the positive expectations. When college teachers are confident that they can identify the obstacles and make plans to overcome it, they will achieve the desired goal. When you know what path to achieve success, but also understand how to overcome obstacles, and that the goal is not to achieve the negative expectations will be reduced. In the face of new tasks and the future, to cultivate college teachers have a positive and optimistic attitude, and at the same time to deal with the reality of the optimistic attitude. College teachers learning life often encounter all sorts of difficulties and problems, to cultivate college teachers optimistic quality, can make them in the face of these setbacks, and actively cope with, no complain, no negative, good attitude to solve the problem, and I believe I can do better, full of hope for the future and the future.

- Develop toughness: When college teachers are fully aware of their own personal assets, such as talent, network skills, to enhance the resilience of College teachers. College teachers will recognize themselves in the face of adversity thoughts and feelings, and in assessing overcome obstacles resources and methods based on choice more toughness of ideas, so that we can produce positive effect. Since most of the contemporary college teachers are born after 90, the material environment of their life is relatively superior, but the ability to resist setbacks and hard-working quality has declined. 80 contemporary college teachers psychological capital should be relatively affluent, only in the individual aspects of the possible existence of a certain defect which has a relationship with the living environment and their own personality characteristics. Psychological capital is different from the personality characteristics, it has both the stability and consistency of personality characteristics, at the same time, he is also able to shape the. Especially now with the rapid development of the society, material products rich, multicultural everywhere, network media every day all in explosive filled with every one of us, college teachers as a youth in the early stages of, more like thinking of life, while also facing more academic pressure, employment pressure, interpersonal stress, adaptation to stress, tenacious quality culture, will not only help university teachers in response to all kinds of pressure, solve their own inner confusion, and for the individual to society, is well suited to the work, and community had a profound and positive effect.

6. CONCLUSION

Based on the analysis and comparison of the previous scholars take the enterprise as the research object in the research of psychological contract, teachers as the research object, to explore the college teachers' Psychological Contract Dimension and performance dimension, psychological factors and analyses the influence of College Teachers' job performance. The questionnaire of college teachers is only the result of the point of time, but they are not followed up for a long time. Therefore, the results of this study lack of dynamic, and psychological contract data and work performance score data are cross sectional data, there is a certain time lag in time, which will also have some impact on the results of this study.

REFERENCES

- Jin, Y., Qin, K. (2014). "The theoretical study on the psychological capital". *Productivity research*, 5, 42-44.
- Luthans, F., Avolio, B. (2005). "The Psychological Capital of Chinese Workers: Exploring the Relationship with Performance". *Management and Organization Review*, 1, 249-271.
- Liu, Q. (2008). "The predictive effect of mental health of college teachers on life satisfaction". *Psychological study*, 04, 12-16.
- Larson, M., Luthans, F. (2006). "Potential Added value of psychological capital in predicting work attitudes". *Journal of Leadership & Organizational Studies*, 13, 45-62.
- Peterson, S., Luthans, F. (2002). "The positive impact and development of hopeful leaders". *Leadership and Organizational Development*, 24, 26-31.
- Pereira, C., Ferreira, C. (2015). "Identification of IT Value Management Practices and Resources in COBIT 5". *RISTI-Revista Ibérica de Sistemas e Tecnologias de Informação*, (15), 17-33.
- Yang, J. (2015). "Psychological capital theory and its research progress". *Science and technology management research*, 2, 10-13.
- Zhao, S., Jiang, J. (2015). "Psychological capital and strategic human resource management". *Economic management*, 9, 55-58.