An SEM-based Analysis in Constructing Occupational Competency Profile for the Prison Police in China in the Information Age

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Abstract

Prison police are those engaged in prison management with the responsibility of the execution of sentences and the correction of offenders, which are also a vital force to maintain social stability. In the age of information, China's prison management system is constantly innovating and changing, thus placing higher demands on the professionalism of prison police officers. Prison police competency describes the potential ability of prison officers to perform well in prison management, which becomes an urgent requirement to improve the professionalism of the police cadre. This study validates a competency model with high dimensional matching for prison police officers using AMOS. The model offers job performance level prediction and a valuable reference for selecting prison police officers, thus guiding practical human resource management. The ultimate founding shows that the stronger the business ability, the stronger the competency of prison police.

Keywords: Information age; Competency model; Prison police officer

Introduction

The "informationization" of prison offender management in China has received widespread attention in recent years. Many economically developed provinces have initially implemented "informationization" of prison offender management, with various new information technologies being actively applied (Feng, Sun, & Huang, 2011). Nevertheless, due to the influence of the prison system, financial security, policies, staff quality, and management philosophy, the significance of enhancing information technology and competence of prison management is also self-explanatory for prison police. The modernization of comprehensive prison offender management is, in a sense, the informationization of prisons (Feng, 2014). Moreover, as information technology is substituting more rapidly, the technical requirements for its innovation are higher and more urgent. Consequently, accelerating the construction of information technology under the prison offender comprehensive management competency is an essential element of prison innovation.

From the present situation of complete prison offender management's information construction in China, prison information technology is comparatively large compared to other government departments, especially public security and other political and legal departments. It is still challenging to realize the sharing of information resources. The construction of the prison offender's integrated management system has a late and thin start, with a poor foundation. The prison police have a limited level of information technology, especially in rehabilitating offenders. The information technology status is even lower (Huang, 2006). Namely, it is rare to use significant information technology data in conjunction with other relevant prison management capabilities to provide targeted and individualized rehabilitation to offenders. According to the evolution of police management, competency models have been studied and constructed by scholars in numerous ways. They are industry-specific, yet competency models have changed with societal changes and cultural differences. In the age of information technology, the competency of prison police officers still needs to enhance continuously.

On the one hand, prison informational management should take the integrated prison offender management system. It refers to the requirements of the National Prison Information Construction Plan, advanced concepts based on hierarchical, modular, and component-based, standardized police management, full consideration of the needs and characteristics of prison offender management, the use of advanced information technology in the prison work process, the completion of the standardization and optimization of offender management processes, the establishment of an integrated management system as the basis of information technology System (Peng, 2011). The construction and use of the competency models can enable the prison management to scientifically allocate and manage the prison officers rationally, allowing the prison officers to perform their proper values and promote the continuous development of the prison officers in proper positions.

On the other hand, the innovation and development of other prison tasks need to rely on information technology before the depth and breadth of development can be vigorously supported through this modern technology to enhance the overall standard of prisons. Taking the prison system of Shandong Province as an example, this paper tries to study the current situation and characteristics of prison management in Shandong Province utilizing questionnaire method and literature synthesis method. The policy management system enables collecting and storing information for a host of capabilities: prison management, prison investigation management. The system contains basic information of offenders, life and health, education and reformation, release from prison, and resolve the incomplete, inaccurate, and insufficient information of traditional prison offender management, and provide more comprehensive and accurate information for integrated prison offender management.

Objective Research

The purpose of this research is to identify the prison's occupational competence profile by starting the factors that shape the ability of prison officers in prison management and to make relevant training recommendations for the Chinese prison police in improving the overall performance of prison officers.

Literature Review

At this stage, China's prison system remains the traditional human management method. With the continuous development of the information age, various statistical methods have emerged. Structural equation modeling is popular in the social science field to effectively validate construction models. The paper introduces the competency model into the human resources management of the prison system based on the structural equation modeling, thereby realizing the excellent establishment of the prison police force and improving the efficiency of its administration of the rules of law.

Occupational competence lies in performing the assigned work with a certain level of professional ethics and professionalism. The nobler the professionalism, the more operational competence and mastery of professional knowledge one possesses, the more positive the work attitude and the more professional competence one has (Liang, 2020). The Australian National Training Council's Occupational Competence considers: The capacity to work within the scope of the occupation or the ability to reach the standard required by the employer and that such standard, in terms of work outcomes, is the degree to which any individual is required to achieve in the role they play in the particular occupation; Occupational competence includes workers' working ability, career transition ability, and creative ability, among which intelligence level, professional knowledge, vocational skills, and psychological quality are the main factors that constitute occupational competence (Shu & Mo, 2008). Occupational knowledge is necessary for those who practice a profession; Extensive occupational knowledge is an asset to developing occupational competence. Occupational knowledge and skills are the manifestations of the internal audit occupational competence framework and are the most easily cultivated and realized competencies (Zhang, 2013). Training a work attitude compatible with the company's core values also maximizes the mobilization of competencies (Shi, 2017).

Regarding the purpose and method of empirical research, domestic and foreign scholars have theoretical bases or hypotheses for research on competency, and this paper follows the four hypotheses based on prior research. As a corollary to this assumption, the hypothesis is that professionalism, work competence, occupational knowledge, and work attitude influence occupational competence. The study constructs a competency model for prison officers based on existing literature, relevant models, and theories, which is a practical guide for cultivating prison officers, selecting, promoting, and evaluating officers, and promoting the continuous growth of prison officers.

Analysis of related concepts

(i) *Structural equation modeling*

Structural equation modeling as a statistical method, abbreviated as SEM, was developed in 1970 by statistician Joerekog (Joerekog, 1993). Structural equation modeling is also known as structural analysis of covariance. It allows the covariance matrix of variables to deal with the relationship between multiple independent and dependent variables and has become an invaluable tool for multivariate data analysis. Researchers have often used structural equation modeling to study phenomena in economics, management, and sociology. It can serve for hypothesis model validation and has the advantages of dealing with multiple dependent variables, allowing variables to contain measurement errors, and dealing with measurement and analysis problems simultaneously.

(ii) *Competency model*

The competency model presents the sum of the competency characteristics of a person who can perform exceptionally well in a position. The competency model uses a scientific approach. The model is helpful for different positions. The application of the competency model allows for effective prediction of the performance of staff in post, screening out those with excellent potential performance and helping to efficiently select staff for entry-level positions.

(iii) *Conceptual framework*

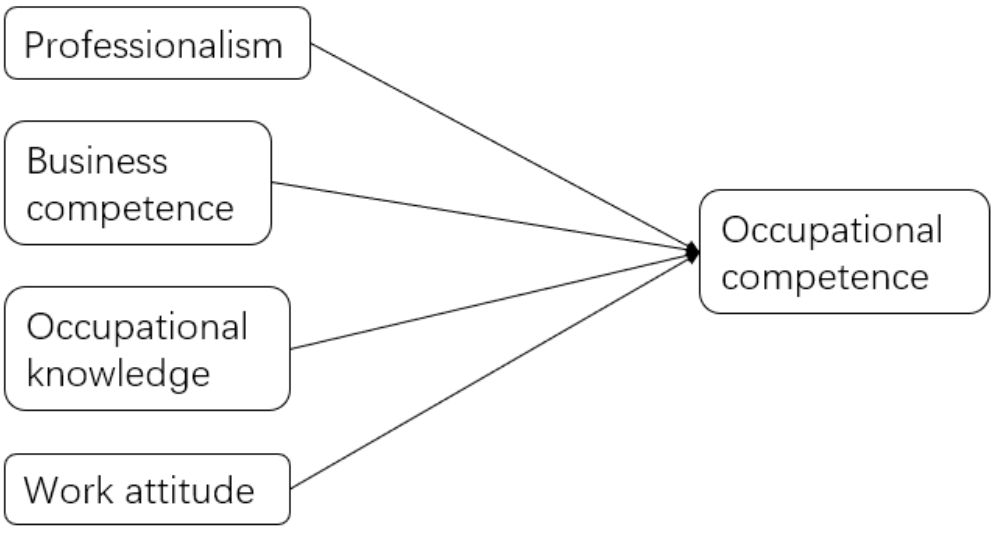

Fig. 1. Conceptual model

Fig. 1 illustrates the conceptual framework diagram derived from the literature review. The author found that professionalism, business competence, occupational knowledge, and work attitude influence occupational competence.

Methodology

Structural equation modeling usually entails questionnaires to obtain information and consequently requires questionnaire design. The questionnaire on prison police competency adapts the given literature, combined with the prison police competency questionnaire by Deng Shuai, Yin Zhanjun (Deng & Xing, 2015), and Gao Yang (Gao, 2015), and finally formed the present questionnaire, i.e., the Prison Policemen Competency Questionnaire. The question item consists of two parts. The first part includes basic personal information, including age, gender, education, years of work, position. The second part of the questionnaire is the competency profile, which mainly covers four dimensions related to professionalism, business competence, occupational knowledge, and work attitude, with 21 questions. The questionnaire applies the 5-level Likert scale: 1 represents "very unconformity," 2 "basic unconformity," 3 "uncertainty," 4 "basic conformity," and 5 "very conformity." The questions are of single-choice format. Non-conformity represents an encounter that is inconsistent with the problem. Some of the sample questions are, "I know all the laws and regulations related to prison management." or, "When I encounter a prisoner who resists discipline, I will investigate his family background, social experience and other aspects of the situation."

Structural equation modeling, professionalism, business competence, knowledge law, and work attitude are exogenous latent variables, and occupational competence is an endogenous latent variable. Professionalism involves four observed variables, business competence involves six observed variables, occupational knowledge involves three observed variables, and work attitude involves four observed variables. The conceptual model, Fig. 1., integrates the four competencies to describe occupational competence.

The questionnaire was distributed to X prison police in Shandong Province using Questionnaire Star. We distributed a total of 300 questionnaires; 285 were successfully collected, with a recovery rate of 95%, 12 invalid questionnaires excluded, and the questionnaire efficiency was 95.7%.

The study began with a reliability analysis using SPSS with AMOS, followed by a validation factor analysis using AMOS 24.0 software to test the structural equation model by the simulation to validate the research model and research hypotheses.

Results

Reliability and validity

We subject all constructs to validity

and reliability evaluations before inferential and descriptive statistical analysis.

The specific data are as follows. First, $\alpha = (k/k-1) *(1 - (\sum Si^2)/ST^2)$ provides the reliability index, where k refers to the number of items in the questionnaire designed for the competency of prison officers. A value around 0.7~0.8 is acceptable. When the value is 0.8 or above, the reliability of the questionnaire is outstanding. All the constructs conform to the above 0.8 value.

Table 1: Cronbach's alpha coefficient

Professionalism	Business competence	Occupational knowledge	Work attitude	Overall model
0.823	0.908	0.815	0.804	0.871

In the aspect of validity assessments, this study ensures uniform dimensions of each construct, with a factor loading of each item above 0.50, and the total variance explained also exceeds 0.50. Correspondingly, we ensure convergent and divergent validity. The value of KMO over 0.6 is suitable for exploratory factor analysis. Regarding Bartlett's spherical significance, when P<.05, there is a strong correlation between variables. Bartlett's spherical significance of this questionnaire is .000, so it is suitable for factor analysis, and its validity is adequate.

The analysis of the construct of prison police competence model based on structural equation modeling

Prison police competence modeling

Fig. 2 depicts the initial conceptual model, which describes four competency domains: professionalism, business competence, occupational knowledge, and work attitude for prison-police management.

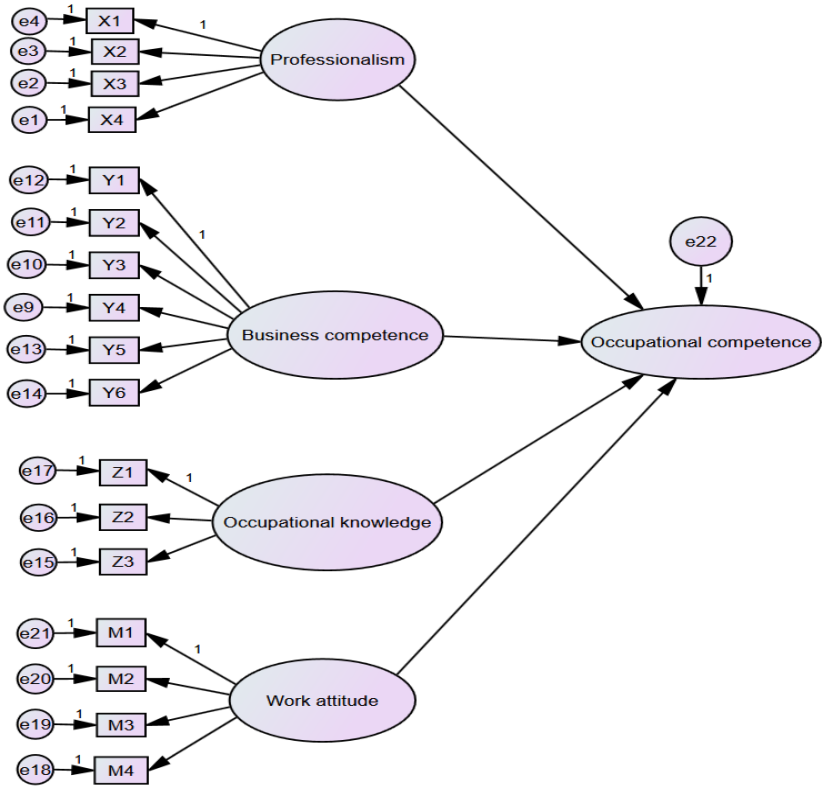

Fig. 2. Initial model

The model is modified following the inspection of the initial model for the correction indices and various fit indices. The original path of the structural equations is shown in Fig. 2 according to the modified model after the revision indices.

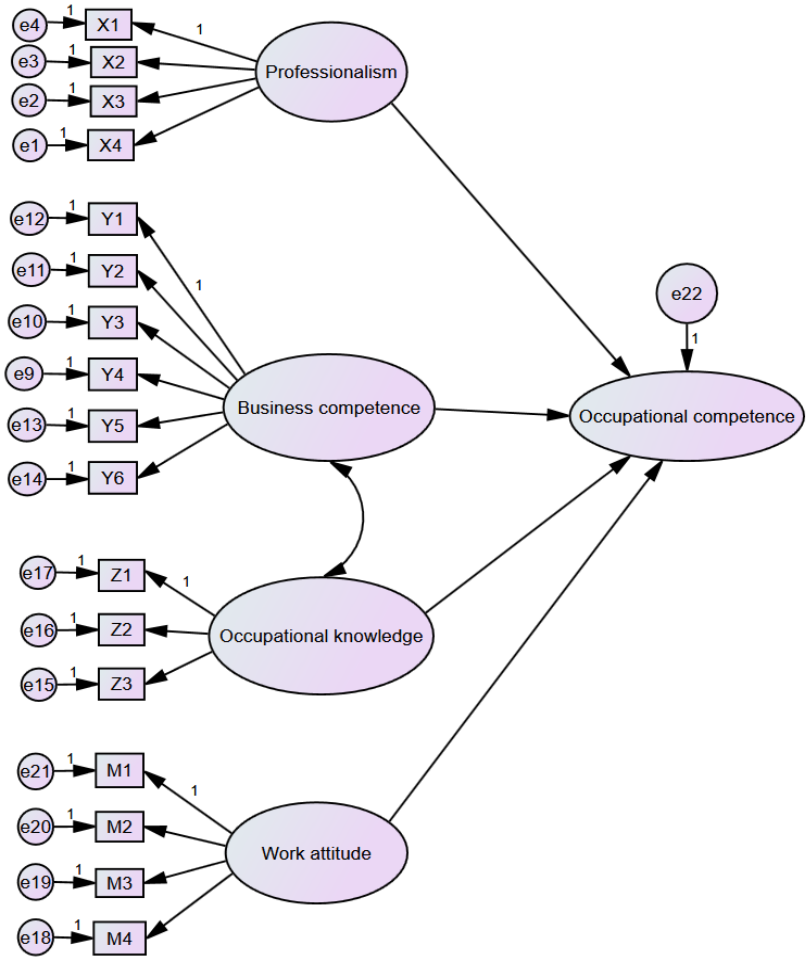

Fig. 3. Modified model

In the original path diagram of the prison-police competency structure, occupational competence is an endogenous latent variable. Furthermore, professionalism, business competence, occupational knowledge, and work attitude are exogenous latent variables, which influence each other—specifically, X_1, X_2, X_3, X_4 as the observed variables for characterizing professionalism. Y_1, Y_2, Y_3, Y_4, Y_5, Y_6 are the observed variables of business competence, Z_1, Z_2, Z_3 as observed variables of occupational knowledge, M_1, M_2, M_3, M_4 as observed variables of a work attitude. Notation "ei" represents the error residuals. The indicator titles corresponding to each observed variable in the original path diagram are shown in Table 2.

Table 2: Table of variables of the prison police competency model

Latent variable		**Observed variables**	
		Symbols	**Tittles**
Endogenous latent variable	**Occupational competence**		
Exogenous latent variables	**Professionalism**	X_1	Self-confidence
		X_2	Hardworking
		X_3	Attentive
		X_4	Positive Optimism
	Business competence	Y_1	Organizational coordination ability
		Y_2	Emergency flexibility
		Y_3	Innovation ability
		Y_4	Environmental Adaptability
		Y_5	Logical reasoning ability
		Y_6	Law enforcement and compliance capabilities
	Occupational knowledge	Z_1	Information Technology Knowledge
		Z_2	Prison Correctional Knowledge
		Z_3	Knowledge of the law
	Work attitude	M_1	Planning
		M_2	Targeting
		M_3	Mental resilience
		M_4	Execution

Goodness-of-fit test for prison police competency model

AMOS 20.0 contains a variety of model fit indexes, in this paper, the absolute fit index CMIN, RMR, and GFI, the value-added fit index CFI, IFI, and NFI (Wu, 2009). The composite fit index AIC was selected to assess the fit merit of the structural equation model modeling of police competency. The calculated goodness-of-fit indicators for the police competency structural equation model in this study are shown in Table 3.

Table 3: Calculated results of the goodness-of-fit of the prison police competency model

Goodness-of-fit index	Absolute fit index			Value-added fit index			Integrated fit index
Adaptation index	CMIN	RMR	GFI	CFI	IF	NFI	AIC
Default model	114.684	0.129	0.917	0.958	0.943	0.913	178.197
Saturated model	0.000	0.000	1.000	1.000	1.000	1.000	146.000
Independent model	1842.209	0.385	0.481	0.000	0.000	0.000	1873.243

The following states the goodness-of-fit reference criterion for the structural equation model of police competency: the smaller the absolute fit index CMIN, the better; Absolute fit index GFI, value-added fit index CFI, IFI, NFI are over 0.9, the larger, the better; The absolute fit index RMR is less than 0.05, the smaller, the better; the closer the integrated fit index AIC is to the saturated model, the better. As a result, this paper's fitted goodness-of-fit indexes of the prison police competency model correspond to the reference standard. The fitted values of the fit indexes all conform to the references. The prison police competency model fits well and has high construct validity.

Estimation of parameters of the prison police competency model

AMOS provides a variety of model estimation methods, implemented through Estimated in the Analysis Project in the View menu. The parameter estimation method usually used is maximum likelihood estimation (MLE). T

able 4, Estimated parameters of the prison police competency model.

Causality			Standardized regression coefficients	Standard error	T-test value	P-value
Occupational competence	←	Professionalism	0.145	0.032	2.741	0.021
Occupational competence	←	Business competence	0.701	0.102	2.407	0.051

Occupational competence	←	Occupational knowledge	0.421	0.021	2.512	0.036
Occupational competence	←	Work attitude	0.131	0.041	2.613	0.019
Professionalism	→	Self-confidence	0.252			
Professionalism	→	Hardworking and enduring hardships	0.438	0.035	2.602	0.003
Professionalism	→	Careful and attentive	0.307	0.101	2.731	***
Professionalism	→	Positive Optimism	0.321	0.086	2.541	***
Business competence	→	Organizational coordination ability	0.791			
Business competence	→	Emergency flexibility	0.847	0.153	7.291	***
Business competence	→	Innovation ability	0.456	0.087	7.136	***
Business competence	→	Environmental Adaptability	0.412	0.103	7.325	***
Business competence	→	Logical reasoning ability	0.812	0.137	7.106	***
Business competence	→	Law enforcement and compliance capabilities	0.825	0.126	7.116	***
Occupational knowledge	→	Information Technology Knowledge	0.703			
Occupational knowledge	→	Prison Correctional Knowledge	0.821	0.194	2.981	0.002
Occupational knowledge	→	Knowledge of the law	0.807	0.182	2.784	***
Work attitude	→	Planning	0.402			
Work attitude	→	Targeting	0.382	0.163	2.654	0.04
Work attitude	→	Mental resilience	0.458	0.124	2.765	0.02
Work attitude	→	Execution	0.524	0.108	2.821	***

Occupational knowledge	→ ←	Business competence	0.342	0.021	2.581	0.039

The blank section with no arithmetic results serves as the reference variable regarding parameter estimation results. The unstandardized coefficient is 1. *** indicates that the p-value is less than 0.001. The p-values are less than 0.05 for the t-test, so the prison police competency model's parameter estimates have the desired significance level.

Analysis of the results of the prison police competency model

1. Occupational competence analysis

In Table 4, prison police officers' professionalism, business competence, occupational knowledge, and work attitude all have significant and direct positive effects on prison police officers' occupational competence, where the coefficients of effects are 0.145, 0.701, 0.421, and 0.131, respectively. The result indicates that the higher the professionalism, the more business competence, and occupational knowledge possessed, the better the work attitude, and the stronger the occupational competence. The four factors that impact occupational competency are the most influential business competence and the least influential in respect to work attitude.

2. Analysis of professionalism factors

Among the observed variables of the latent variable professionalism, the coefficient of influence of the factor "self-confidence" is 0.252. The coefficient of influence of the "self-confidence" factor on occupational competence is 0.252 x 0.145, with an influence coefficient of 0.037. The influence coefficient of the "hardworking" factor is 0.438, and the influence coefficient of the "hardworking" factor on occupational competence is 0.438 x 0.145, with an influence coefficient of 0.064. The coefficient of influence of the "attentive" factor is 0.307, and the coefficient of influence of the "attentive" factor on professional competence is 0.307 x 0.145, with an influence coefficient of 0.045. The coefficient of influence of the "positive optimism" factor is 0.321, and the coefficient of influence of the "positive optimism" factor on professional competence is 0.321 x 0.145, with an influence coefficient of 0.047. As a result, hard work is the most crucial factor affecting the professionalism of prison police, followed by the positive, optimistic factor.

3. Business competence factor analysis

The following states the coefficients of the observed variables of the latent variable business competencies: "organizational coordination ability" is 0.791, "emergency flexibility" is 0.847, "innovation ability " factor is 0.456, "environmental adaptability" factor is 0.412, "logical reasoning ability" factor is 0.812, and "law enforcement and compliance capability" is 0.825. The coefficients of these factors on occupational competence are 0.791×0.701, 0.847×0.701, 0.456×0.701, 0.412×0.701, 0.812×0.701, 0.825×0.701, and 0.825×0.701. 0.825

× 0.701, the obtained indirect impact coefficients were 0.554, 0.593, 0.320, 0.289, 0.569, 0.578, respectively. Hence, "emergency flexibility" has the most influence on the business competence of prison police, and "environmental adaptability" has the least effect on the business competence of prison police.

4. Occupational knowledge factor analysis

The coefficient of the observed variables of the latent variable occupational knowledge is 0.703 for the factor " information technology knowledge," 0.821 for the factor "prison correctional knowledge," and 0.807 for the factor "knowledge of the law." "The coefficient of the influence of these factors on occupational competence is 0.703×0.421, 0.821×0.421, 0.807×0.421, and the indirect influence coefficients are 0.296, 0.346, and 0.340, respectively. From this, it is evident that "prison correctional knowledge" has the most significant influence on the occupational knowledge of prison officers, which is in line with the professional characteristics of prison officers (Zhang, 2016)

5. Analysis of work attitude factors

Among the observed variables of the latent variable work attitude, the coefficient of the "planning" factor is 0.402, the coefficient of the " targeting" factor is 0.382, the coefficient of the "mental resilience" factor is 0.458, and the coefficient of the "execution" factor is 0.524. The coefficients of these factors on professional competency are 0.402×0.131, 0.382×0.131, 0.458×0.131, 0.524×0.131, and 0.524×0.131. 0.524 × 0.131, and the indirect influence coefficients obtained were 0.053, 0.050, 0.060, and 0.069, in that order. Therefore, “execution” has the greatest influence on the work attitude of prison officers.

As for the relationship between business competence and occupational knowledge, according to Table 5, there is a mutual positive influence between them, and the standardized regression coefficient is 0.342, which shows that the business competence and occupational knowledge of prison police officers are influenced by each other. If one of the factors changes, it must impact the other one, and the two reinforce each other.

Discussion and Conclusion

This study contributes significantly to the extant literature. Establishing the prison-police competency model can offer many implications: academy training, prison police performance management, prison police entry selection, prison police training, and providing a scientific basis for enhancing the efficiency of human resources management and prison information construction. Consistent with Tao (2021), facilitating the standard of prison police management through the information technology dimension and enhancing the efficiency of the prison police in all aspects.

Occupational competence is a combination of different competency elements associated with the high performance required for a specific job in an organization. Its utility improves by matching people's competency to their positions. Meanwhile, professional competency can also be specifically differentiated to apply to the new situation's higher work requirements effectively and improve the individual competency of prison officers effectively. Hence, the

study of occupational competence can provide a different sound working mechanism for constructing prison policy, which is more conducive to establishing a prison police team that meets the requirements of the times and possesses comprehensive quality.

Relevant applications based on the competency model

(i) Establish a training system based on the competency model

As noted in this study, business competency has the most significant influence on occupational competency. Thus, it is necessary to focus not only on explaining vocational knowledge but also on long-term training planning based on the current situation of prison management and the requirements of police tasks, focusing on improving competence. The implementation of specific training can be carried out through course lectures, case studies to quickly improve the business competence of prison police officers and thus enhance the overall competency. In addition, "emergency flexibility" and "law enforcement and compliance capabilities" have a significant impact on the business competence of prison police. Consequently, the training needs to focus on developing these two competencies. As an example, the training content focuses on cultivating the ability of prison police to investigate cases in detail and conduct precise analysis, in addition to the need to pay attention to developing the ability of prison police to respond to crisis events and law enforcement and compliance with the law. For example, in the face of sudden brawls in prison, corrections officers need to abide by the law, not violence to violence. Prison management needs to handle flexibly, timely pacification of both sides, not simply a severe punishment for the brawlers, to prevent the reduction of the enthusiasm of the prisoner to cooperate with the rehabilitation.

(ii) Establish a selection mechanism based on a competency model

In the prison police competency model, “prison correctional knowledge” and "knowledge of the law" have a considerable impact on the occupational knowledge of prison policy, which is why it is necessary to examine the legal knowledge in the selection of prison police. At the current stage, the prison police in China recruits using an interview and physical fitness test and a written test (Li, 2015). The current investigation examines the interviewer's comprehensive analytical ability, emergency flexibility, logical reasoning ability, and other cognitive abilities during the interview section. In contrast, the interviewer's spiritual qualities, human attitude, and other personality traits lack a certain degree of investigation. The competence model reveals that professionalism, business competence, occupational knowledge, and work attitude jointly influence occupational competence; therefore, in the structured interview, the interviewer's personality, mental qualities, and work attitude are required to be examined to some extent. Regarding the concrete implementation, competency content such as mental qualities and work attitude can be assessed using psychological tests and psychological indicators.

(iii) Establishing a performance management mechanism based on the competency model

Traditional performance appraisal relies mainly on the subjective impressions of the rater, and the appraisal aspect is inadequate in terms of quantification and places too much emphasis on results, thus failing to meet the motivational effect (Wang, 2016). The application of the competency model to performance management, on the other hand, can combine police officers' personal goals with career development and help break through the previous limitations of pure superior-to-subordinate appraisal (Yao & He, 2013). Besides, when it comes to a specific implementation, the indicators in the competency model can be transformed to form measurable indicators, thereby targeting the assessment and realizing the quantification of the assessment method. For example, in the evaluation basis, the " execution" of the work attitude can be taken as the evaluation criterion, and the number of rehabilitation of the prisoner as the evaluation basis. Another example is that the competency indicators of "Hardworking," "Attentive," and "Positive optimism" could be assessed in the form of a rating scale and scored according to the corresponding performance. Then all the scores would be added up to arrive at the final evaluation score, a combination of qualitative and quantitative indicators to avoid the disadvantages of subjective factors and achieve the performance management of the personnel in the position.

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