Research on Performance Evaluation Index System of Administrative Equipment Asset Management in China

Xiao Rou[1,a], Yuyang Hua[2,b*], Dong Liu[3,c], Yuanyuan Chen[4,d]

{[a]2657266176@qq.com;*[b]3753656394@qq.com;
[c] 2177898797@qq.com;[d]18438080@qq.com}

[1]Department of Management Science and Economics, Naval University of Engineering, 717 Jiefang Avenue, Qiaokou District, Wuhan City, Hubei Province, China
[*2]Beijing-Dublin international College at BJUT,100 Pingleyuan,Chaoyang District,Beijing City,China
[3]Intermediate Accountant of Human Resources and Social Security Bureau of Shashi District, Jingzhou, 434000, China
[4]Department of Management Science and Economics, Naval University of Engineering, 717 Jiefang Avenue, Qiaokou District, Wuhan City, Hubei Province, China

Abstract. Exploring the performance evaluation of administrative Equipment asset management is of great significance in terms of categorizing and constructing the index system of administrative asset management, stimulating the management activity, and promoting the reform of asset management. The key to building a scientific and reasonable evaluation system lies in the design of evaluation indexes, and how to build a comprehensive index system is the first task of establishing an evaluation system. To this end, guided by the administrative and institutional asset management process, the equipment is taken as the research object, and an equipment asset management performance evaluation index system is constructed. To provide a reference for the classification of the index system and the formation of a targeted performance evaluation index system.

Keywords: equipment asset management, management process, index system

1 Introduction

State-owned assets can be divided into operational state-owned assets, administrative state-owned assets, and resource state-owned assets, of which, according to the form of existence administrative state-owned assets can be divided into fixed assets, current assets and intangible assets, etc., It is the material basis for administrative institutions to fulfill their functions and missions and serve people. Among which, the status of fixed assets is particularly prominent. In the face of more and more complex composition, more and more huge number of fixed assets[1], administrative institutions to improve the level of asset management is urgent, how to evaluate its management performance is targeted to improve management methods, improve the management level of the premise, the importance of self-evident.

The Ministry of Finance document defines fixed assets as" Assets controlled by administrative institutions to meet the needs of their own business activities or other activities, with a service

PMIS 2024, March 15-17, Changsha, People's Republic of China

DOI 10.4108/eai.15-3-2024.2346528

life and unit value more than the prescribed standards, and basically maintain their original material form in the process of use. " It is divided into six main categories: (1) general equipment; (2) special equipment; (3) books and archives; (4) houses and structures; (5) furniture, utensils and flora and fauna; (6) cultural relics and displays. Most of the existing studies directly consider assets as the research object or fixed assets as the research object, and fewer studies consider a particular type of asset in fixed assets alone. However, through the analysis of fixed assets, the characteristics of its six major categories of assets vary greatly, and are managed differently in terms of value measurement, property rights management, and use efficiency, making it unsuitable for evaluating their management using the same criteria.

Therefore, this paper considers the equipment assets as the research object, considers the requirements of the asset management reform that is being promoted, and constructs a set of more comprehensive, feasible and targeted equipment asset management index system according to the asset management process.

2 Construction of equipment asset management performance evaluation index system

2.1 Ideas for the construction of the index system

The idea of constructing the index system is divided into two steps[2]. The first step is to design an index system. Firstly, the indicators are clarified according to the content of asset management[3], and then the second-level indicators are divided according to the business process of its management, and then the regulatory documents of asset management are collected[4], and the requirements of each content of asset management are analyzed comprehensively considering the relevant literature, and the third-level indicators are designed accordingly. The second step is to clarify the indicator standards. Define the processing method and the scoring standard of the indicator value.

2.2 Design of the index system

In accordance with the above steps and ideas, the indicators are designed. According to the content and process of asset management (see Figure 1), five first-level indicators are clarified, including equipment asset allocation level indicators, equipment asset utilization level indicators, equipment asset disposal level indicators, inventory report level indicators and supervision and inspection level indicators. Before constructing the index system, the key terms in the index system are clearly defined in the scope of the boundaries: assets refer to administrative assets, fixed assets refer to fixed assets in administrative institutions, and equipment assets (equipment) refer to the sum of general-equipment and special-purpose equipment.

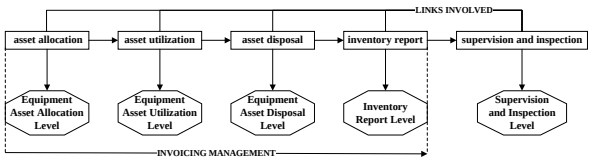

Figure 1 Design of level 1 indicators by management process.

2.2.1 Equipment asset allocation level (A1)

The equipment asset allocation level index is a basic reflection of the equipment owned by the unit, and reflects the configuration of the equipment, which can be used to evaluate the rationality of the equipment scale structure and the scientific of the allocation[5]. According to the process of asset allocation (see Figure 2), the index can be divided into two secondary indicators, namely，the equipment asset planning indicator[6] and the equipment asset scale structure indicator[7], and the constructed index system is shown in Table 1.

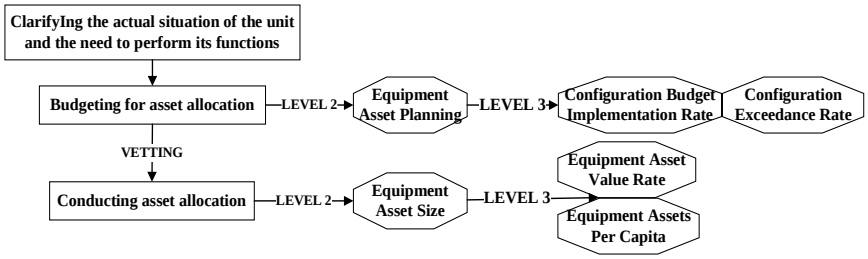

Figure 2 Indicators at level 2 and 3 of equipment asset allocation.

Table 1 Equipment asset allocation level index system.

Level 1 indicators	Level 2 indicators	Level 3 indicators	Indicator description /Formula for calculating the indicator	Indicator type
A1 Equipment Asset Allocation Level	A11 Equipment Asset Planning	A111 Configuration Budget Implementation Rate	$\frac{\text{Number of tasks performed}}{\text{Total number of tasks}}$	Extremely large
		A112 Configuration Exceedance Rate	$\frac{\text{Value of equipment assets that exceeded the standard configuration}}{\text{Total value of equipment assets allocation standa}}$	Extremely small
	A12 Equipment Asset Size	A121 Equipment Asset Value Rate	$\frac{\text{Value of equipment assets}}{\text{Value of fixed assets}}$	Stationary type
		A122 Equipment Assets Per Capita	$\frac{\text{Value of equipment assets}}{\text{Number of personnel occupying and using depart}}$	Stationary type

(1) Equipment Asset Planning (A11)

According to the requirements, the asset allocation should be carried out in strict accordance with the asset allocation budget and asset allocation standards, and shall not be configured without budget or over budget, and shall not be configured in excess of the standard, therefore, Configuration Budget Implementation Rate is selected to check the implementation of the budget, and the implementation of the configuration standard is checked by Configuration Exceedance Rate, so as to reflect whether the unit is configured for equipment in accordance with the requirements.

Configuration Budget Implementation Rate (A111): According to the regulations, industry departments at all levels should prepare asset allocation budgets after comprehensive analysis according to the asset situation. This indicator can reflect the implementation of the equipment asset allocation budget, whether it is implemented in a timely manner according to the budget, from the quantitative dimension is to consider the existence of budget savings, and the numerical value can better reflect the amount of task execution, the indicator is an extremely large indicator.

Configuration Exceedance Rate (A112): Because when evaluating purely from the quantitative dimension, the indicator results may be great affected by some assets with low value[8] but considerable number of over-standard allocations, which will magnify the harm of the results. Starting from the value dimension, considering the total value of the equipment assets with over-standardized configurations, it can reflect the harm caused by the equipment assets with over-standardized configurations in a fairer way. The indicator is an extremely small indicator.

(2) Equipment Asset Size (A12)

Equipment asset size reflects the specific distribution of equipment, and the scale involves the total amount of equipment assets and per capita occupancy, from Equipment Asset Value Rate, Equipment Assets Per Capita two tertiary indicators can grasp the specific situation of the unit's equipment asset allocation.

Equipment Asset Value Rate (A121): reflects the structural proportion of equipment in total assets, which can be used to measure whether the structure of equipment is reasonable and whether there is too much or too little proportion. This indicator is a stationary type.

Equipment Assets Per Capita (A122): reflects the value of equipment assets per capita in the occupying and utilizing departments, and the value dimension is used here because the simple use of the quantity indicator will lead to the existence of some equipment assets with low value and large number to increase the value of this indicator, amplify the evaluation results, whereas the use of value rate combines both the quantity and the value, which is more impartial. This indicator is a stationary type.

2.2.2 Equipment asset utilization level (A2)

The Equipment Asset Utilization Level is a reflection of the use of equipment and the use of management, reflecting the efficiency of its use, storage efficiency, etc. According to the asset use management process and work requirements (see Figure 3), this indicator is decomposed into four secondary indicators, namely, Information Security, Equipment Asset Use Status, Equipment Asset Use Efficiency, and Equipment Asset Guarantee Ability[9], and the secondary indicators related to property rights are not set up because the equipment usually does not involve property rights, and the constructed asset utilization level index system are shown in Table 2.

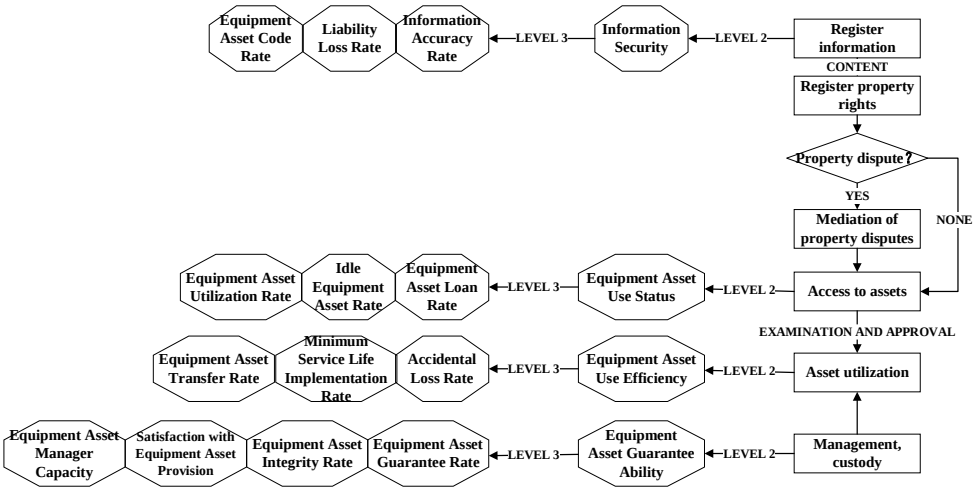

Figure 3 Indicators at level 2 and 3 of equipment asset utilization.

Table 2 Equipment asset utilization level index system.

Level 1 indicators	Level 2 indicators	Level 3 indicators	Indicator description /Formula for calculating the indicator	Indicator type
A2 Equipment Asset Utilization Level	A21 Information Security	A211 Information Accuracy Rate	$\frac{\text{Number of assets whose registration information is consistent with the equipment asset information}}{\text{Total equipment assets}}$	Extremely large
		A212 Liability Loss Rate	$\frac{\text{Number of assets in which the responsible person could not be found}}{\text{Total equipment assets}}$	Extremely small
		A213 Equipment Asset Code Rate	$\frac{\text{Number of equipment assets that have been coded in compliance}}{\text{Total equipment assets}}$	Extremely large
	A22 Equipment Asset Use Status	A221 Equipment Asset Utilization Rate	$\frac{\text{Total number of actual working hours of equipment assets in use}}{\text{Total number of hours that equipment assets were usable}} \times \frac{\text{Minimum age of use}}{\text{Age of use}}$	Extremely large
		A222 Equipment Asset Loan Rate	$\frac{\text{Number of equipment assets lent}}{\text{Total equipment assets}}$	Extremely small
		A223 Idle Equipment Asset Rate	$\frac{\text{tNumber of idle equipment assets}}{\text{Total equipment assets}}$	Extremely small
	A23 Equipment Asset Use Efficiency	A231 Equipment Asset Transfer Rate	$\frac{\text{Number of equipment assets used for transfer}}{\text{Total equipment assets}}$	Extremely large
		A232 Accidental Loss Rate	$\frac{\text{Amount of accident losses on equipment assets}}{\text{Total value of equipment assets}}$	Extremely small

		A233 Minimum Service Life Implementation Rate	$\frac{\text{Number of invalid equipment assets that have not reached the minimum useful life}}{\text{Total equipment assets}}$ (Invalid means to be scrapped, scrapped)	Extremely small
	A24 Equipment Asset Guarantee Ability	A241 Equipment Asset Guarantee Rate	$\frac{\text{Actual ownership of equipment assets}}{\text{Actual requirements for equipment assets}}$	Stationary type
		A242 Equipment Asset Integrity Rate	$\frac{\text{Number of equipment assets of good quality}}{\text{Total equipment assets}}$	Extremely large
		A243 Satisfaction with Equipment Asset Provision	Questionnaire method	Qualitative indicators
		A244 Equipment Asset Manager Capacity	Test equipment asset managers to get scores	Qualitative indicators

(1) Information Security Indicators (A21)

In accordance with the management requirements, all units should improve the asset information registration and statistics system, clarify the main body of asset management, update the information changes in a timely manner, and establish an asset card before the equipment assets are earned. Therefore, the establishment of Equipment asset utilization level is a way of measuring and evaluating the construction of equipment asset information security by checking whether the information is registered and updated in a timely manner through the Information Accuracy Rate, whether there is a clear management body through the Liability Loss Rate, and whether the coding requirements are implemented through the Equipment Asset Code Rate.

Information Accuracy Rate (A211): reflects whether the equipment information registration is accurate and updated in a timely manner, the indicator is an extremely large indicator.

Liability Loss Rate (A212): reflects whether each equipment has a corresponding responsible person, whether the management responsibility is in place, the indicator is an extremely small indicator.

Equipment Asset Code Rate (A213): asset card coding work is a task vigorously promoted by the Ministry of Finance, and is a basic project to promote the construction of asset visualization，the coding should be done in such a way as to achieve one code for each item, with a detailed record, so that no omission of items or objects can occur. The indicator is an extremely large indicator.

(2) Equipment Asset Use Status (A22)

The Equipment Asset Use Status is a description of the state of use of the equipment, the asset

management information system divides assets into in-use assets, idle assets, damaged assets to be scrapped and loaned assets according to different use statuses. Knowledge of the different states of equipment can be a side understanding of the efficiency of the use of equipment. According to the above classification, this indicator is divided into Equipment Asset Utilization Rate to check the use efficiency of equipment assets in use, Equipment Asset Loan Rate to check whether it strictly controls lending, and Idle Equipment Asset Rate to check the use efficiency of equipment assets.

Equipment Asset Utilization Rate (A221): This indicator reflects whether the equipment in use is fully utilized possible and is not wasted. This is an extremely large indicator, and the higher the value, the better the utilization and the higher the score. However, when equipment was not used as planned, the total number of hours of use is set to zero.

Equipment Asset Loan Rate (A222): Responding to how much equipment the unit has lent, according to the regulations, the unit should strictly control the asset lending of assets, and the indicator is set as extremely small.

Idle Equipment Asset Rate (A223): reflects the unit's unused equipment after the configuration and reflects whether the equipment has overstocked inventory and has too much idleness. The indicator is set as extremely small.

(3) Equipment Asset Use Efficiency (A23)

The Equipment Asset Use Efficiency is to evaluate the use of equipment, judge whether the results and the efficiency of the use are as expected, Qian Kun, in his "Public Institution State-Owned Asset Management Performance Evaluation Research" divides the Equipment Asset Use Efficiency into Equipment Asset Transfer Rate and Accidental Loss Rate, which are appropriate to consider the utilization efficiency of the assets from the perspectives of asset entry and custody, and sets them as the two tertiary level indicators. In "Interim Measures for the Performance Evaluation of State-owned Assets Management of Municipal Administrative Institutions in Heze City" also put forward the Minimum Service Life Implementation Rate Indicator, which is from the perspective of asset disposal, and the first two perspectives together constitute the "configuration-use-disposal" management chain. Therefore, under the Equipment Asset Use Efficiency, the Equipment Asset Transfer Rate[5] is set to check the utilization efficiency of equipment assets in the process of allocation, the Accidental Loss Rate[10] to check the utilization efficiency in the process of utilization and the Minimum Service Life Implementation Rate to check the utilization efficiency in the process of disposal.

Equipment Asset Transfer Rate (A231): Reflects the transfer of equipment within departments, across departments and units, and determines whether the unit can flexibly use the equipment and maximize benefits of the equipment. Transferred equipment assets include the equipment assets transferred within the department, the equipment assets transferred across departments within the unit, the equipment assets transferred to the public compartment and the equipment assets transferred from other units. The indicator is an extremely large indicator.

Accident Loss Rate (A232): It can measure the asset value of the unit due to the accident and the invalidity of the equipment assets, the value dimension is used because it focuses on the loss caused by the accident to the unit, and the value dimension can better reflect the damage of the accident to the fund, and further reflect the use of the equipment by the unit. The indicator is set as extremely small.

Minimum Service Life Implementation Rate (A233): to judge whether the unit has made full use of the equipment, the quantity dimension is used because this indicator needs to pay more attention to the utilization of each piece of equipment, and is used to measure whether the unit's awareness of the full use of equipment is in place, with the value of the dimensions there may be the unit does not care about the efficiency of low-value assets, the direction of the arbitrary abandonment. The indicator is set as extremely small.

(4) Equipment Asset Guarantee Ability (A24)

The Equipment Asset Guarantee Ability shows the equipment that the unit can provide support, and the unit's demand for assets and the guarantee of assets correspond to the benchmarking degree between the functional demand side and the supply side of asset support. According to the requirements, each unit should accurately provide asset security strength and asset storage integrity according to the requirements and set up two indicators of equipment asset guarantee rate and equipment asset integrity rate. Zhang Xiaoning and Wang Chunjuan pointed out that the Equipment Asset Guarantee Ability is not comprehensive enough from the perspective of its data alone, and two qualitative indicators of Satisfaction with Equipment Asset Provision[11] and Equipment Asset Manager Capacity can be introduced for evaluation, and the combination of the two can better reflect its real guaranteed ability. Therefore, four tertiary indicators are set up to measure and evaluate the equipment support ability, including the Equipment Asset Guarantee Rate, the Equipment Asset Integrity Rate, the Satisfaction with Equipment Asset Provision, and the Equipment Asset Manager Capacity.

Equipment Asset Guarantee Rate (A241): reflects whether the equipment ownership meets the functional needs of the unit and whether the number of equipment ownership is reasonable. The indicator value is a fixed indicator.

Equipment Asset Integrity Rate (A242): reflects the actual need, how much equipment can meet the requirements, directly reflects the unit equipment custody, but also the most true reflection of the unit equipment support capacity, the indicator is an extremely large indicator.

Satisfaction with Equipment Asset Provision (A243): To examine whether the equipment provision of the unit is timely and efficient, and whether the users are satisfied, which is a qualitative indicator, through the preparation of a questionnaire, issued to the equipment possession and use department for research, and scored through the survey results.

Equipment Asset Manager Capacity (A244): a qualitative indicator, according to the requirements of the rules and regulations for management personnel, the test questions are designed, and the scores are obtained through the test of equipment asset management personnel, which are required to reflect the management concept of equipment asset management personnel, the grasp of asset status and other related aspects.

2.2.3 Equipment asset disposal level (A3)

The Equipment Asset Disposal Level[12] is the reflection of the disposal of unit equipment, according to the asset disposal process and requirements (see Figure 4), the index system of equipment asset disposal level constructed is shown in Table 3.

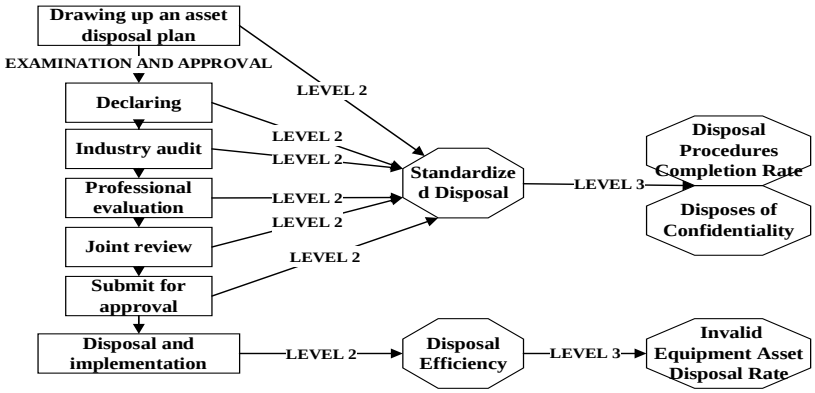

Figure 4 Indicators at Level 2 and 3 of equipment asset disposal.

Table 3 Equipment asset disposal level index system.

Level 1 indicators	Level 2 indicators	Level 3 indicators	Indicator description /Formula for calculating the indicator	Indicator type
A3 Equipment Asset Disposal Level	A31 Standardized Disposal	A311 Disposal Procedures Completion Rate	$\frac{\text{Number of equipment assets disposed of in complete formalities}}{\text{Total amount of equipment assets disposed}}$	Extremely large
		A312 Disposes of Confidentiality	No hidden danger and no problems (100 points). Hidden danger and no problems (80 points). Major hidden danger and minor problems (60 points). Major hidden danger and leakage (40 points)	Qualitative indicators
	A32 Disposal Efficiency	A321 Invalid Equipment Asset Disposal Rate	$\frac{\text{Number of invalid equipment assets disposed of}}{\text{Total amount of invalid equipment assets before disposal}}$	Extremely large

(1) Standardized Disposal (A31)

The first requirement for asset disposal is that the approval authority must be strictly performed, and the disposal shall be carried out depending on the process, and no unit or individual shall dispose of assets privately, and the equipment involved in secrets also needs to pay attention to whether there is a risk of or leakage of secrets, and it must be disposed of after technical treatment. In accordance with this requirement, there are two third-level indicators: Disposal Procedures Completion Rate and Disposes of Confidentiality.

Disposal Procedures Completion Rate (A311): reflects whether there are incomplete procedures in the disposal of equipment, the indicator is an extremely large indicator.

Disposes of Confidentiality (A312): For confidential equipment, it is important to pay attention to its confidentiality when disposing of it. This indicator is a qualitative indicator and is divided into four levels(see Table 3).

(2) Disposal Efficiency Index (A32).

Under the premise of standardized disposal, the disposal of administrative and institutional assets also requires "anywhere in the air, anywhere in waste", and timely disposal of invalid assets, so a three-level indicator of the Invalid Equipment Asset Disposal Rate is designed for evaluation.

Invalid Equipment Asset Disposal Rate (A321): reflects the disposal efficiency of equipment assets, which is an extremely large indicator.

2.2.4 Inventory report level(A4)

This indicator is a reflection of the inventory[13] and reporting[2] of the unit's assets, and can reflect whether the unit has carried out the inventory in accordance with the regulations, the results of the inventory and the level of report preparation. According to the process (see Figure 5), the index system is constructed, as shown in Table 4.

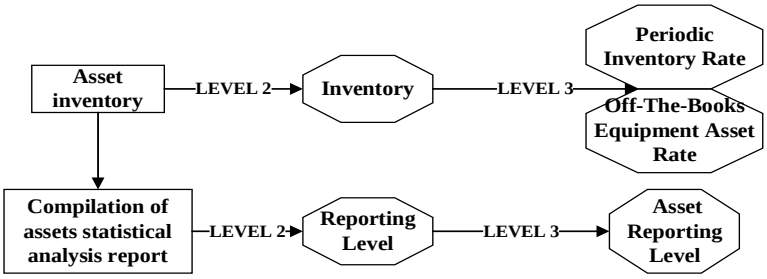

Figure 5 Indicators at level 2 and 3 of Inventory report level.

Table 4 Inventory report level index system.

Level 1 indicators	Level 2 indicators	Level 3 indicators	Indicator description /Formula for calculating the indicator	Indicator type
A4 Inventory Reporting Level	A41 Inventory	A411 Periodic Inventory Rate	$\frac{\text{Actual number of inventories}}{\text{Number of inventories is specified}}$	Stationary type
		A412 Off-The-Books Equipment Asset Rate	$\frac{\text{Value of equipment assets was profitable and loss-in-stock}}{\text{Total value of equipment assets}}$	Extremely small
	A42 Reporting Level	A421 Asset Reporting Level	Scoring the comprehensiveness of the report's content, the accuracy of the data, and the effectiveness of the measures. Three levels of grades are set for the three aspects of comprehensiveness, accuracy and effectiveness. Excellent, good and poor, with a score of 100 for a report that is excellent in all three aspects, and a reduction of 10 points for each lower level in each aspect.	Qualitative indicators

(1) Inventory(A41)

In accordance with the management requirements, each unit must regularly conduct asset inventories and organize special inventories in the event of major reforms, major changes, major losses and other changes, so as to keep track of asset surpluses and deficits and dispose of them in a timely manner. Under this indicator, a Periodic Inventory Rate[3] is set to check whether the asset inventory has been carried out in accordance with the regulations, and off-the-books equipment asset rate to check the custody of its assets.

Periodic Inventory Rate (A411): reflects whether the unit conducts asset inventories in accordance with the requirements, the indicator is a fixed indicator.

Off-The-Books Equipment Asset Rate (A412): reflects the unit's custody of equipment, and from the value dimension better reflects the loss caused by the unit when keeping the equipment, the indicator is an extremely small indicator.

(2) Reporting Level (A42).

Each unit needs to prepare an annual asset statistical analysis report, according to the requirements, to reflect the changes in the number and value of unit assets, and the report should be comprehensive, accurate and effective. therefore, a three-level indicator on the level of Asset Reporting has been set up to evaluate whether the unit's asset report meets the requirements.

Asset Reporting Level (A421): This indicator is a qualitative indicator, and experts are invited to score the unit's asset report, scoring the comprehensiveness of the report's content, the accuracy of the data, and the effectiveness of the measures(see Table 4).

2.2.5 Supervision and inspection level(A5).

Supervision and Inspection Level is the reflection of the implementation of various systems for unit assets[14, p. 55000], which plays an important role in ensuring the safety of assets and improving the level of asset management. According to the content of asset supervision and management (see Figure 6) to divide the indicators, other content are reflected in the previous asset management process, and the indicators designed earlier have reflected part of the content of supervision and inspection, so only the indicators are set for the content that is not involved, and the construction system is shown in Table 5.

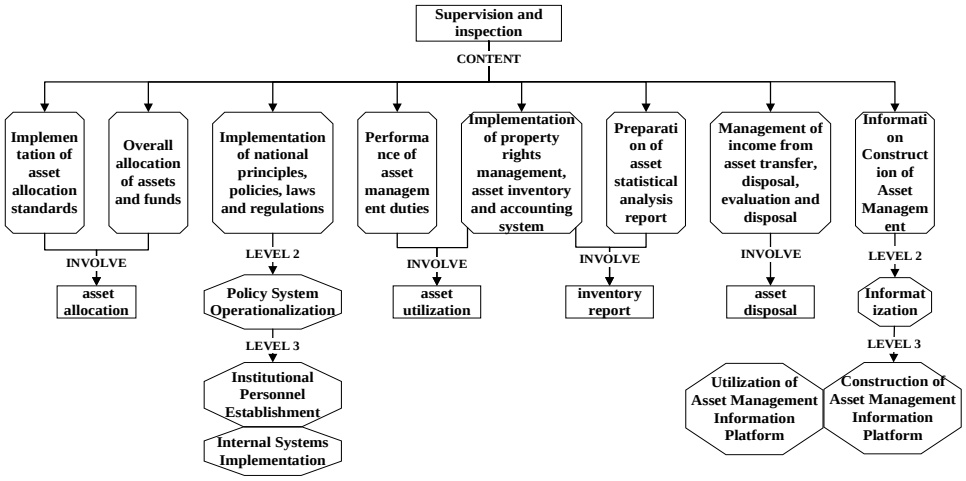

Figure 6 Indicators at levels 2 and 3 of Supervision and inspection level.

Table 5 Supervision and inspection level index system**.**

Level 1 indicators	Level 2 indicators	Level 3 indicators	indicator description /Formula for calculating the indicator	Indicator type
A5 Supervision and	A51 Policy System	A511 Internal Systems Implementation	Having a complete internal system and implementing it (100 points). Having a complete internal system and having an average level of	Qualitative indicators

Inspection Level	Operationalization		implementation (80 points). Having an incomplete internal system and having an average level of implementation (60 points). And having no internal system or having an internal system but not implementing it (40 points).	
		A512 Institutional Personnel Establishment	A dedicated asset management institution with a full-time asset management staff (100 points). A merger with other departments with a full-time asset management staff (80 points). A merger with other departments with no full-time asset management staff (60 points). And no asset management institution or department with no full-time asset management personnel (40 points).	Qualitative indicators
	A52 Informatization	A521 Construction of Asset Management Information Platform	Established and complete (100 points). Established but not complete (80 points). Under construction (60 points). And not established (40 points).	Qualitative indicators
		A522 Utilization of Asset Management Information Platform	Full proficiency (100 points). Full use of individual modules (80 points). Use of individual modules only (60 points). And no use (40 points).	Qualitative indicators

(1) Policy System Operationalization (A51)

Through the expert to evaluate the implementation of policies, rules and regulations, especially the implementation of the daily management system of assets, it mainly focuses on the implementation of the system and personnel institutions. Therefore, two three-level indicators are set up, namely Internal Systems Implementation and Institutional Personnel Establishment.

Internal Systems Implementation (A511): reflects whether the unit has established a complete internal system and implemented it, including the post responsibility system, post rotation system. This indicator is a qualitative indicator that is scored by experts and is divided into four grades (see Table 5).

Institutional Personnel Establishment (A512): Each department shall establish an asset management and supervision institution, and the units subordinate to each department shall set up a full-time agency or make it clear whether the units at all levels have arranged special management personnel. This indicator is a qualitative indicator, which is scored by experts and is divided into four levels (see Table 5).

(2) Informatization (A52)

Information construction is an important measure to improve the level of asset management, can completely collect and make good use of asset data, has an important role in asset management departments at all levels[11], the Ministry of Finance has now developed an asset management information platform, which mainly evaluates the installation and use of units, with two three-level indicators, namely, Construction of Asset Management Information Platform and Utilization of Asset Management Information Platform[15].

Construction of Asset Management Information Platform (A521): This is a qualitative indicator that is scored by experts on four levels (see Table 5).

utilization of Asset Management Information Platform (A522): This indicator is a qualitative indicator that is scored by experts and is divided into four levels (see Table 5).

2.3 Clarify the indicator standards

Clarifying the indicator standards refers to stipulating the scoring criteria of the indicators, and the scientific and reasonable standards can ensure the effectiveness of the application results of the indicator system. In this article, there are two types of indicators, one is qualitative and the other is quantitative. Quantitative indicators are divided into extremely large indicators, extremely small indicators and stationary indicators according to needs. The treatment of qualitative indicators is already done at the time of interpretation of the indicators, so only quantitative indicators are treated in the following.

The indicators are processed using a range normalization method, which directly eliminates the indicator dimensions and normalizes them.

(1) extremely small indicator means that the smaller the indicator value, the better the result and the higher the score, the formula is shown in (1).

$$Y_i = \frac{maxX_i - X_i}{maxX_i - minX_i} \tag{1}$$

(2) extremely large indicator means that the larger the indicator value, the better the result and the higher the score, the formula is shown in (2).

$$Y_i = \frac{X_i - minX_i}{maxX_i - minX_i} \tag{2}$$

(3) The stationary indicator means that the closer the indicator value is to the fixed value, the more in line with the expected result is, and the higher the score, the formula is shown in (3).

$$Y_i = \begin{cases} \frac{X_i - minX_i}{maxX_i - minX_i}, & X_i < X_b \\ 100, & X_i < X_b \\ \frac{maxX_i - X_i}{maxX_i - minX_i}, & X_i < X_b \end{cases} \tag{3}$$

Among them, X_i is the calculated value of the indicator, $maxX_i$ is the maximum value of the indicator, $minX_i$ is the minimum value of the indicator, X_b is the standard value of the indicator, and Y_i is the result of the processing of the indicator. The final score of the metric is $Score = Y_i \times 100$. The range of values and standard values are all from national regulations, and if there are no national regulations, they will be determined based on their experience after discussion with experts.

Finally, according to the proportion of the score to the full score (score/full score for this item), it is divided into four levels, with a score of less than 60 for failing, 60-80 for passing, 80-90 for good, and 90-100 for excellent.

3 Conclusion

Through the analysis and summary of asset management content, process and requirements, the construction of equipment asset management performance evaluation index system has the characteristics of strong orientation, clear purpose and strong pertinence, etc., the country can

grasp the specific situation of equipment assets and equipment asset management of each unit through this system, and the data obtained is more convenient for analysis, and each unit clarifies the equipment asset management objectives through the system and clarifies the management focus.

This paper constructs a performance evaluation index system for equipment assets, which is based on the whole process of asset management, and fully analyzes and considers the relevant regulatory requirements, and the data comes from the established information system, which is easy to obtain, and has the characteristics of being more comprehensive, feasible and more legal. At the same time, some of the indicators in this paper have common characteristics and can be broadened and applied to other types of assets, which has certain reference significance for the construction of the performance index system of administrative and institutional asset management.

References

[1] X. Zhang, "Design and Implementation of University Asset Management System Based on Discriminant Analysis and Decision Tree Model," in *2021 4th International Conference on Information Systems and Computer Aided Education*, Dalian China: ACM, Sep. 2021, pp. 2047–2052. doi: 10.1145/3482632.3484096.

[2] J. Amadi-Echendu, "Assessment of Engineering Asset Management in the Public Sector," in *Engineering Asset Management - Systems, Professional Practices and Certification*, P. W. Tse, J. Mathew, K. Wong, R. Lam, and C. N. Ko, Eds., in Lecture Notes in Mechanical Engineering. , Cham: Springer International Publishing, 2015, pp. 1151–1156. doi: 10.1007/978-3-319-09507-3_97.

[3] O. Kaganova and R. Nayyar-Stone, "Municipal Real Property Asset Management: An Overview of World Experience, Trends and Financial Implications," *J. Real Estate Portf. Manag.*, vol. 6, no. 4, pp. 307–326, Jan. 2000, doi: 10.1080/10835547.2000.12089624.

[4] R. Ball and J. Halwachi, "Performance indicators in higher education," *High. Educ.*, vol. 16, no. 4, pp. 393–405, 1987, doi: 10.1007/BF00129112.

[5] Y. Chunhui, "Discussion on the Innovation of University Asset Management in the New Era," presented at the 2019 2nd International Workshop on Advances in Social Sciences（IWASS 2019）, London, Nov. 2019. doi: 10.26914/c.cnkihy.2019.040515.

[6] D. Maletič, M. Maletič, B. Al-Najjar, and B. Gomišček, "An Analysis of Physical Asset Management Core Practices and Their Influence on Operational Performance," *Sustainability*, vol. 12, no. 21, p. 9097, Oct. 2020, doi: 10.3390/su12219097.

[7] E. G. Too, "A Framework for Strategic Infrastructure Asset Management," in *Definitions, Concepts and Scope of Engineering Asset Management*, vol. 1, J. E. Amadi-Echendu, K. Brown, R. Willett, and J. Mathew, Eds., in Engineering Asset Management Review, vol. 1. , London: Springer London, 2010, pp. 31–62. doi: 10.1007/978-1-84996-178-3_3.

[8] R. Srinivasan and A. K. Parlikad, "An approach to value-based infrastructure asset management," *Infrastruct. Asset Manag.*, vol. 4, no. 3, pp. 87–95, Sep. 2017, doi: 10.1680/jinam.17.00003.

[9] S. S. Msongole, R. C. Bakuwa, and B. O. Mkandawire, "Assessing the level of application of physical asset management core practices at water boards in Malawi," *Heliyon*, vol. 8, no. 11, p. e11614, Nov. 2022, doi: 10.1016/j.heliyon.2022.e11614.

[10] A. Van Horenbeek and L. Pintelon, "Development of a maintenance performance measurement framework—using the analytic network process (ANP) for maintenance performance indicator

selection," *Omega*, vol. 42, no. 1, pp. 33–46, Jan. 2014, doi: 10.1016/j.omega.2013.02.006.
[11] A. Parida, "Asset Performance Assessment," in *Asset Management*, T. Van Der Lei, P. Herder, and Y. Wijnia, Eds., Dordrecht: Springer Netherlands, 2012, pp. 101–113. doi: 10.1007/978-94-007-2724-3_7.
[12] J. Wang, "Approaches of Improving University Assets Management Efficiency," *Int. J. High. Educ.*, vol. 4, no. 4, p. p235, Oct. 2015, doi: 10.5430/ijhe.v4n4p235.
[13] V. Frolov, L. Ma, Y. Sun, and W. Bandara, "Identifying Core Functions of Asset Management," in *Definitions, Concepts and Scope of Engineering Asset Management*, vol. 1, J. E. Amadi-Echendu, K. Brown, R. Willett, and J. Mathew, Eds., in Engineering Asset Management Review, vol. 1. , London: Springer London, 2010, pp. 19–30. doi: 10.1007/978-1-84996-178-3_2.
[14] J. Woodhouse, "Briefing: Standards in asset management: PAS 55 to ISO 55000," *Infrastruct. Asset Manag.*, vol. 1, no. 3, pp. 57–59, Sep. 2014, doi: 10.1680/iasma.14.00013.
[15] A. Haider, "Information Systems Based Asset Management Evaluation," in *Information Systems for Engineering and Infrastructure Asset Management*, Wiesbaden: Gabler Verlag, 2013, pp. 99–128. doi: 10.1007/978-3-8349-4234-0_4.