Data center engineering project risk assessment based on risk matrix model

Ding Ting

China Information Consulting & Designing Institute Co.,Ltd., Jianye District, Nanjing, Jiangsu, China
[a]e-mail: dingting.cicdi@chinaccs.cn

Abstract. With the rapid growth of the digital economy, data center construction will be in a high-speed period, data centers from the scale of investment and technical complexity compared to the traditional information infrastructure are quite different, each link involves economic and production safety risks, in order to implement the safety production management work, enterprises gradually form a negative list of construction projects, the formation of their own risk assessment system. In the process of data center risk assessment, a risk matrix model should be established to analyze the construction process, and the data collected by the risk investigation should be identified, analyzed, evaluated and countermeasures proposed, and finally a negative list and a unified risk language should be formed.

Keywords : data center, risk assessment, Risk matrix，negative list

1 Introduction

With the rapid growth of the digital economy, the development and construction of data centers will be in a high-speed period, data centers are an important topic under the new infrastructure of the country, and local government departments give strong support, bringing great advantages to the development of the data center industry. On February 17, 2022, the National Development and Reform Commission, the Central Cyberspace Administration, the Ministry of Industry and Information Technology, and the National Energy Administration jointly issued a notice agreeing to start the construction of national computing power hub nodes in 8 places, including Beijing-Tianjin-Hebei, Yangtze River Delta, Guangdong-Hong Kong-Macao Greater Bay Area, Chengdu-Chongqing, Inner Mongolia, Guizhou, Gansu, and Ningxia, and planning 10 national data center clusters. At this point, the national integrated big data center system has completed the overall layout design, and the "East Number West Calculation" project has been officially launched.

The state has recently issued a series of relevant policies around the overall planning of the computing power of the data center, which will gradually form a new layout of multi-level and integrated data centers, and put forward higher requirements for the construction of new infrastructure. The data center construction unit will accelerate the

V. Escudero et al. (Eds.): BADS 2022, AHCS 11, pp. 906–919, 2023.
https://doi.org/10.2991/978-94-6463-102-9_94

land acquisition, planning and construction of the big data center park, further promote the intensive layout of computing power resources to the core area, accurately allocate resources, and efficiently utilize resources.

Under the requirements of national policies, the construction of super-large and large-scale data centers in various places will also increase, and the complexity of the project will become larger and larger as the volume rises. The task of safety production management of construction projects is becoming more and more important, starting from the consideration of safety production management of construction projects, we must adhere to the principle of safety first and prevention first. Data centers are quite different from traditional information infrastructure in terms of investment scale and technical complexity, and it is urgent to change concepts and raise awareness, especially in planning, investment decisions and engineering construction, which involve economic and production safety risks, so the importance, urgency and complexity of risk assessment work should be fully understood. For enterprises to build their own data centers, in order to stabilize the implementation of safety production management, a risk assessment system should be established, a negative list for the formation of construction projects should be gradually established, risk management and response measures should be strengthened, and the high-quality development of enterprises in the new information infrastructure should be jointly promoted[1].

At present, the construction of data centers involves a wide range, and it has the characteristics of large scale, complex technical links, long construction period, complex working environment, and many stakeholders, and has very high requirements for the whole process management of the project, so the construction unit tends to adopt the EPC model. The EPC project faces greater uncertainty, and the EPC model bears most of the risks originally borne by the owner compared with the traditional contracting model. Therefore, if the design institute or design enterprise wants to get involved in the EPC general contracting business, it is necessary to take strict risk control measures for the EPC project and identify and assess the risks faced by the EPC general contractor in order to effectively deal with it [2].

2 Guiding ideology and working ideas for data center risk assessment

2.1 Guiding ideology for risk assessment

Adhere to the bottom line thinking, enhance the sense of distress, improve prevention and control capabilities, and focus on preventing and resolving major risks. Establish and improve the risk assessment mechanism of major projects of enterprises, take risk assessment as the pre-procedure and necessary condition for major project decision-making, realize the fundamental transformation from passive risk response to active risk prevention and control, and solve the source, basic and fundamental problems of data center engineering construction. Firmly establish the awareness of risk management and control of each line of the enterprise, strengthen the approval of major decisions, major projects and major matters of data center engineering construction projects, accurately implement the risk assessment work before the establishment of investment projects, scientifically carry out the pre-prevention and control work of risk management of data center construction projects, based on the guiding ideology of "source governance and prevention first", ensure the scientific and comprehensive nature of data center investment decisions, continuously strengthen risk awareness, improve risk mitigation capabilities, and improve risk prevention and control mechanisms.

2.2 Risk assessment work ideas

Risk assessment refers to the management work of identifying various risks in the planning, investment decision-making and engineering construction of the data center by taking certain methods and procedures, assessing the probability and impact of risks, determining the risk level according to their own ability to bear risks, and proposing and taking corresponding risk response measures to correct them. Taking into account the differences in social and economic conditions between provinces across the country, before conducting the overall risk assessment analysis, a model should be established to conduct risk investigation on the construction process of data centers in various places, and then carry out specific work including risk identification, analysis, evaluation and response measures according to the implementation steps of risk assessment.

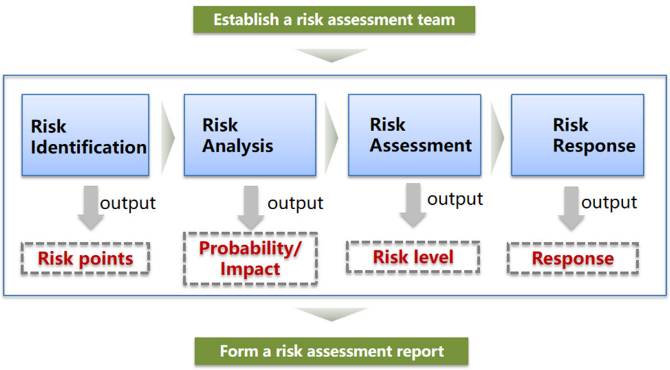

Fig. 1. The overall idea of risk assessment work（Self-drawn）

3 Implementation initiatives for data center risk assessments

3.1 Risk research

Due to the differences in social and economic conditions in various provinces, in order to make more comprehensive prediction and analysis of the project, the provincial data center park should formulate a risk assessment work plan or detailed rules before the project decision-making and start-up, and clarify the work objectives, organizational structure, screening, evaluation methods, assessment methods, work processes or steps of major projects.

Set up a risk assessment team to conduct risk investigation of the project, the risk investigation from the project construction background, overview, around the safety production, project progress control, project quality control, project investment (cost) control and other aspects of the overall project objective control, according to the project implementation process will be divided into the following stages, including but not limited to the planning plan stage, feasibility study project stage, survey and design stage, bidding and procurement stage, construction stage and completion acceptance and other 6 stages for the interface to sort out the key risk points, And put forward reasonable suggestions for risk response.

3.2 Risk assessment

Risk assessment is a process consisting of three parts: risk identification, risk analysis and risk evaluation.

Risk identification phase

.Risk identification is the first step in risk management and the basis of risk management. Only on the basis of correctly identifying the risks faced can we actively choose a reasonable and effective method to deal with them.

Risk identification can be carried out in the following ways: First, it can be judged by perceptual understanding and historical experience, and in the construction of the project, it is often accumulated through various problems encountered in the project; Secondly, it can be analyzed, summarized and sorted out by various objective data and records of risk accidents to form a risk memorandum; Thirdly, through the necessary expert visits, it is possible to identify the various obvious and potential risks and the patterns of their losses. Because risk is uncertain and variable, but at the same time follows certain laws, risk identification is a continuous and systematic work, requiring risk managers to pay close attention to changes in existing risks and discover new risks at any time.

In this paper, taking the risk assessment work of the self-built data center of the enterprise as an example, in the preliminary preparation stage of the risk assessment work, the risk assessment working group is first established, the risk assessment team establishes a working model and investigates several data center construction samples nationwide. Through the comprehensive analysis of the case samples of the projects already built and under construction, the risk points are identified, the risk list with reference significance is provided for the risk managers, and the potential main risk factors that the construction project may face are accumulated, and the source of risk is identified.

Based on the model, this paper divides the project construction implementation process into the following six stages, including the planning and planning stage, the feasibility study stage, the survey and design stage, the bidding and procurement stage, the construction stage and the completion acceptance stage, and the research results of the sample cases are sorted out and analyzed, and the following representative risk lists are formed.

The first stage: Planning the planning phase

(1) The plot involves agricultural land, forest land, ecological protection redline, power corridor, etc., there are difficulties in land acquisition, and the time for land acquisition is too long, affecting the progress of the project;

(2) Poor traffic accessibility of site selection, unfavorable or unclear geological conditions, and imperfect municipal supporting conditions;

(3) Hydropower resources have potential safety hazards, insufficient supply and high costs;

(4) The adjustment of policies and regulations puts forward higher requirements for project site selection, energy-saving technology and application, construction plan, design planning, electricity price, renewable energy utilization, environmental impact assessment, soil and water conservation, etc., which may bring risks such as construction plan adjustment and investment increase;

(5) The planning conditions (parking spaces, civil air defense, green construction, prefabricated, building volume ratio, green space rate, height limit) are unfavorable or imperfect;

The second stage: Feasibility study phase

(1) The customer's construction requirements are not clear, and the construction scale and technical plan are uncertain;

(2) Difficulties in introducing electricity from outside the city; Insufficient power capacity; The implementation progress of the introduction of external mains power is uncontrollable;

(3) Failing to pass the energy-saving assessment, failing to obtain energy consumption indicators, or failing to meet the construction needs of the current period;

(4) Difficulty in introducing water sources and insufficient supply;

(5) There are omissions in the construction content, and the basic input data is incomplete or inaccurate;

(6) The construction plan is unreasonable or the design depth is not enough, and the requirements for implementing the group's standardization plan are not in place;

(7) Do not meet the relevant requirements of energy consumption, electricity consumption, water use, environmental impact assessment and so on;

(8) The use of energy-saving technology is unreasonable;

(9) The investment estimate and economic evaluation are unreasonable; Key indicators such as construction scale, construction period, cost, and economic evaluation indicators deviate from the group standards;

(10) The organization and coordination between the front end of the market and the construction department are poorly managed, and the needs of customers are disconnected from the construction;

The third stage: the survey and design stage

(1) The civil engineering is implemented first, and the modification of the mechanical and electrical scheme at the request of the customer may lead to inconsistencies with the original civil design;

(2) Market research is not carried out in combination with the scheme and group standards, and the selection of materials and equipment is separated from the market;

(3) Abnormal geological conditions appear in the area outside the survey site, such as river channels, tombs, air raid shelters, lone stones and other buried objects that are unfavorable to the project; Presence of a weak lower reclining; The holding layer is a sloping stratum, with uneven bedrock surfaces or caverns in the geotechnical soil;

(4) The preliminary design does not meet the needs of preparing construction bidding documents, ordering major equipment and materials, and preparing construction drawing design documents;

(5) The design of construction drawings does not meet the needs of equipment material procurement, non-standard equipment production and construction;

(6) The design documents are incomplete, the content is missing, there are many contents that need to be deepened, supplemented and changed for the second time, and the interface is blurred, resulting in increased construction difficulty and out-of-control cost;

(7) The pipeline has not been systematically planned, and in the process of implementation, there is a conflict with the comprehensive pipeline;

(8) The connection between the civil construction stage and the supporting process stage is insufficient, resulting in the rework of the crossover part of the project, nest work and the implementation of the plan;

(9) The progress of geological survey does not match the progress of the design, and cannot meet the needs of the preparation of design documents;

(10) The preliminary design and construction drawing design are inconsistent with the feasibility study stage plan, resulting in investment deviations, schedule deviations and later implementation difficulties;

The fourth stage: the survey and design stage

(1) The project is broken to zero to avoid bidding, or the bidding should be tendered but not tendered; The degree of disclosure of bidding information is insufficient, and there is a suspicion of circumventing public bidding; The preparation of bidding documents is not strict and the content is not standardized; There is vicious competition in price or fraudulent materials in the bidding unit;

(2) The market research work in the early stage of bidding is insufficient or unreasonable, resulting in the unsmooth development of bidding work and the risk of harming the interests of enterprises or the legitimate rights and interests of others; There are more procurement links (involving more departments and responsible personnel), which affects the approval efficiency of the procurement process and affects the overall progress of procurement; The bidding work is poorly organized and the work cycle is too long, which affects the overall duration of the project;

(3) The management of equipment materials and purchase orders is not in place, the model, specification, quantity and technical parameters of the equipment and main materials are not implemented, and the arrival time lags behind the original plan, affecting the project duration; The project procurement materials cannot be delivered on time, or the delivery quality does not meet the requirements of the original order, affecting the project duration;

(4) The project has failed to bid for multiple times, affecting the procurement progress; Not familiar with the bidding process of the local trading center (such as bidding filing, document review, bidding plan publicity, etc.), and the implementation of the procurement plan is not in place;);

(5) The list of quantities compiled is not clear; There are missing items in the list, and the character description is vague; Incorrect application of the quota suborder; Miscalculation, miscalculation or overcounting of prices; The setting of the bidding control price is unreasonable;

(6) The subcontracting unit selected by the general contracting unit has problems such as unqualified qualifications or grades, weak construction capacity, insufficient financial support, inadequate plan implementation, poor reputation, etc., which affect the quality and progress of the project and have hidden dangers in safety management;

(7) The description of contract terms is not standardized; The main or key terms of the contract are inconsistent with the solicitation documents; The clauses of the material and equipment supply contract omit key contents (such as specifications and models, technical indicators and quality standards of materials and equipment, etc.);

(8) The contract signing is not standardized, and the contract management and performance are not in place; The progress payment exceeds the proportion agreed in the contract, and there is a risk of funds;

(9) The performance of the equipment does not meet the requirements of the technical specifications;

(10) Material prices fluctuate frequently, especially the increase in a larger extent affects the procurement progress or cost;

The fifth stage: Construction Phase

(1) The procedures for temporary sewage discharge and construction waste disposal are not perfect; Project cost control is not in place, design changes, project visas are more; The construction period control is not in place, often lags behind the planned construction period, and the coordination of the site is difficult to coordinate between the three links and one level, and the water and electricity, which affects the progress of the project; Hidden project management is not in place, there are problems such as poor quality and irregular processes; The general contract management and coordination are not in place, affecting the cross-operation and project duration;

(2) The phenomenon of arrears of wages to migrant workers by the general contracting unit or other contractors affects social stability and corporate reputation;

(3) Safety management, safe and civilized construction, health and occupational health management are not in place, there are many serious hidden dangers, and rectification is not implemented in a timely manner; The safety responsibilities of each unit at the scene are not in place, and there are many safety hazards, which may lead to accidents or injuries, especially in the hole operation (falling from a height), the oil engine operation (electric shock, fire, poisoning, equipment damage), electrical welding operation (fire, object blow, personal injury, electric shock), high-voltage operation (electric shock), hoisting operation (object strike, lifting injury, mechanical injury), scaffolding operation (falling from a height, object strike), platform operation (falling from a height, collapsing), ascending equipment operation (falling from a height, object strikes) and other aspects;

(4) The introduction of external municipal electricity is complex, involving many units, long approval process, delayed construction period, and construction safety management is not in place;

(5) The management of engineering materials of the construction unit is not in place, and the management of entering and leaving the warehouse is chaotic; The implementation of the equipment material supply plan is not in place, and the construction period plan is delayed: there are quality defects in the equipment and materials; The arrival of equipment lags behind the order plan, and the quality of the integrated equipment installation process is unqualified;

(6) The application for approval and construction work lags behind the plan, such as the procedures for the filing of each approval, construction permit, safety and quality supervision, etc.;

(7) The intersection of the engineering interface of the phased construction is relatively serious, and there is a risk of omission or unclear interface;

(8) Design changes and visas caused by changes in the scope of work and design requirements, etc., affecting the project cost or duration;

(9) The covid-19 epidemic has affected the project duration; Extreme weather and other events affect the progress of the project; suspension of work due to social and political events; (10) During the construction period, the price of materials fluctuates frequently, especially when the increase is large, which affects the progress of project implementation and is prone to contract disputes;

(10) The construction process does not meet the technical standards, and the quality does not meet the requirements of the acceptance specifications.

The sixth stage: Completion and Acceptance Phase

(1) The project settlement information is incomplete or lost, affecting the settlement progress; Projects cannot be closed or handed over in a timely manner;

(2) The division and sub-acceptance are unqualified; The equipment joint commissioning test is not qualified; Planning acceptance exceeds the planning conditions, and unqualified acceptance needs to be rectified; The special acceptance of fire control does not meet the requirements, and it is necessary to rectify and test and accept it many times;

(3) The quality of the completed documents is unqualified, the information is incomplete, and the signature and seal problem is prominent; There are omissions, omissions or losses in archival archives.

Combined with the risk assessment report model, the risk list of the project construction process was sorted out, and a total of 5 types of first-class risk types including environment and society, technology and engineering, market, policy, and organizational management were formed, and a total of 47 second-class risk types including unfavorable project site selection, policy and regulation adjustment, and customer demand uncertainty were sorted out, and specific risk point descriptions were carried out, including but not limited to major projects in policy planning, land acquisition and demolition, introduction of mains power, energy consumption indicators, safety production, public health, etc., and specific risk point descriptions were carried out, including but not limited to major projects in policy planning, land acquisition and demolition, introduction of mains power, energy consumption indicators, safety production, public health, The main risk factors, the possibility of occurrence and the degree of impact on ecological environment, business needs, investment budgets, and quality of material materials.

Risk analysis phase

Risk analysis is the process of understanding the nature of risk, which refers to the analysis of the possibility of an event and the degree of impact on the project objectives after the event, and the impact refers specifically to the negative impact on the project objectives. Risk analysis is the evaluation and measurement of the impact and consequences of risks, including qualitative and quantitative analysis. Quantitative analysis is the quantitative analysis of the probability of each risk and its consequences for the project objectives, as well as the degree of overall risk of the project. Its role and purpose are: to determine the probability of achieving the goal of a particular project; Identify the risks that need the most attention by quantifying the extent to which each risk affects the project objectives; Identify realistic and achievable costs, schedules, and scope goals.

Based on this, the risk function is first established, which describes the risk with two variables, one is the probability or probability of the event occurring, and the other is the impact on the project goal after the event occurs. Risk can be expressed as r (p, 1=px1) by a binary function where p is the probability of the risk event occurring and 1 is the impact of the risk event on the project objectives.

(1) Risk probability

According to the likelihood of the occurrence of risk factors, the risk probability can be divided into five grades.

Table 1. Probability level of risk[3]

Serial Number	Probability rating	Likelihood of occurrence	Denote
1	Severe	81%-100%，It is very likely to happen	S
2	High	61%-80%，The possibility is high	H
3	Medium	41%-60%，Expected to occur in the project	M
4	Little	21%-40%，This cannot happen	L
5	Negligible	0%-20%，Very unlikely	N

(2) Risk impact

The size or level of risk is proportional to both the probability of a risk event occurring and the degree of impact of a risk event on the project objectives. According to the size of the impact on the project after the risk occurs, it can be divided into five impact levels.

Table 2. The impact of risk[3]

Serial Number	Effect Extent	The degree of impact on the project's objectives	Denote
1	Severe effect	The entire project goal failed	S
2	High effect	Target values (schedule, quality, cost) have dropped significantly	H
3	Medium effect	The target has a moderate impact and is partially achieved	M
4	Little effect	The objectives of the corresponding parts are affected and do not affect the overall objectives	L
5	Negligible effect	The target impact of the corresponding part is negligible and does not affect the overall goal	N

Risk assessment phase.

The risk matrix method is used, taking the probability of the occurrence of the risk factor as the abscissa, the magnitude of the impact on the project after the occurrence of the risk factor as the ordinate coordinate, and the probability (using the numerical grading scale to measure the possibility of risk) and the impact (the severity of the consequences) are combined to obtain the semi-quantitative assessment result.

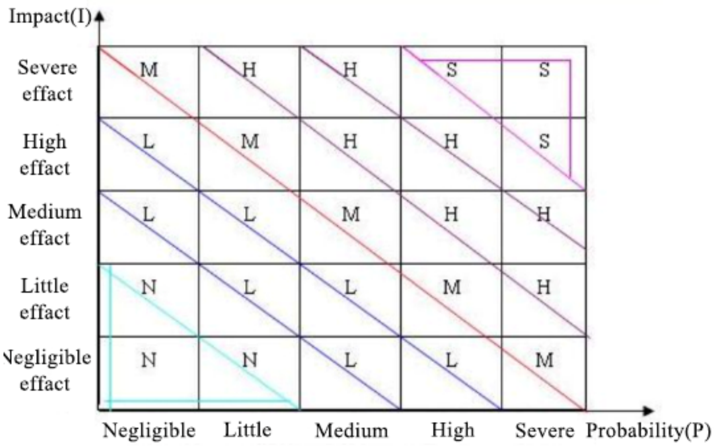

Fig. 2. Risk-probability impact matrix[3]

Table 3. The level of risk[3]

Serial Number	Risk level	Possibilities and consequences of occurrence	Denote
1	Severe Risk	The possibility is high, the loss is large, the project is changed from feasible to unfeasible, and active and effective preventive measures need to be taken	S zone
2	High Risk	The possibility is greater, or the loss is larger, the loss is affordable to the project, and certain precautions must be taken	H zone
3	Medium Risk	The possibility is unlikely, or the loss is not large, generally does not affect the feasibility of the project, and certain precautions should be taken	M zone
4	Little Risk	The likelihood is small, or the loss is small, and does not affect the viability of the project	L zone
5	Negligible Risk	The likelihood is small, the loss is small, and the impact on the project is minimal	N zone

According to the above analysis, the risk points are sorted into primary risk types and secondary risk types, and then according to the frequency and degree of impact, the risk matrix is used to assess the risks, and the major and large risks in the construction stage are sorted out, as shown in the following table

Table 4. Risk levels at different stages of construction projects（Self-drawn）

Stage	Risk identification		Risk assessment		
	Primary risk type	Secondary risk type	Probability	Degree of impact	Risk level
Planning the planning phase	Environmental and social risk	The project site selection is unfavorable	H	H	S
	Policy risks	Disposal risk of idle land	L	S	H
Feasibility study phase	Market risk	Customer needs are uncertain	M	H	H
	Technical and engineering risk	Resource supply risk	M	H	H
the survey and design stage	Market risk	Customer needs are not being met	M	H	H
	Environmental and social risk	An anomaly occurred at the survey site	L	S	H
	Technical and engineering risk	Insufficient depth of design	M	H	H
	Technical and engineering risk	The pipeline is not systematically planned	M	H	H

the survey and design stage	Organizations manage risk	Procurement scenarios or processes are not compliant	M	H	H
	Organizations manage risk	Improper internal organization or chaotic management	M	H	H
	Organizations manage risk	Material management is not in place	M	H	H
	Technical and engineering risks	The terms of the contract are not perfect	M	H	H
Construction Phase	Organizations manage risk	Construction management is chaotic	H	H	S
	Organizations manage risk	Workers are in arrears in wages	M	S	S
	Organizations manage risk	Security management is not in place	H	H	S
	Organizations manage risk	The introduction of mains electricity is lagging behind	M	H	H
Completion and Acceptance Phase	Organizations manage risk	Improper internal organization or chaotic management	H	L	H
	Technical and engineering risk	The quality of the construction process is not qualified	M	H	H

3.3 Risk response

After predicting the main risk factors and their degree of risk, corresponding avoidance and prevention measures should be proposed according to different risk factors in order to reduce possible losses. In view of the different levels of risks, corresponding risk prevention countermeasures are proposed in the project investment decision-making stage, that is, the project feasibility study stage, and the possible countermeasures mainly include risk avoidance, risk control and risk transfer[4].

(1) Risk avoidance: Risk avoidance is the source of cutting off risk, which means that it may completely change the plan or even negate the project construction. Risk-averse countermeasures, to some extent, mean the loss of opportunities for possible profits of the project, so risk-aversity measures should only be used if the possible

losses caused by risk factors are quite serious or the cost of taking measures to prevent risks is too large.

(2) Risk control: Risk control is a controllable risk, which proposes corresponding measures to reduce the possibility of risk occurrence and reduce the degree of risk loss, and demonstrates the feasibility and rationality of the proposed risk control measures from the perspective of combining technology and economy.

(3) Risk transfer: Risk transfer is a risk prevention method that transfers part of the possible risk of the project. Risk transfer can be divided into two types: insurance transfer and non-insurance transfer. Among them, the non-insurance transfer is to transfer part of the risk of the project to the project contractor, such as the project technical equipment, construction, etc. there may be risks, and part of the risk loss can be transferred to the contracting party in the signing contract[5].

4 Conclusions

There are many parks in various provinces across the country, regional dispersion, engineering construction capabilities and risk response capabilities are uneven, risk assessment work should be the theoretical methods, advanced experience in industry and enterprise risk assessment, fully combined with the actual construction of data center parks, in accordance with the requirements of focused, sustainable and closed-loop to develop a data center engineering project risk assessment work plan and path. The risk assessment work will focus on the three main lines of good design, good implementation and good effect, and guide the implementation of risk assessment with scientific methods, pragmatic actions, and perceptible results as the overall logic and methodology.

(1) Combined with the risk analysis model and research results, formulate a list of enterprise risks, including but not limited to the main risk factors, possibilities and degrees of impact of major projects in policy planning, land acquisition and demolition, introduction of mains electricity, energy consumption indicators, safety production, public health, ecological environment impact, business needs, investment budgets, and material material quality.

(2) In the process of risk assessment in the process of data center construction, through the continuous review of the risk assessment report and the iterative improvement of the risk list, the tracking and evaluation mechanism for the implementation of the enterprise risk assessment work plan (including: assessment methods, assessment methods, tool templates, evaluation index systems, etc.) is gradually constructed, and the progress, efficiency and effect of the risk assessment work are timely assessed. Carry out rolling updates of risk assessment work plans and carry out relevant thematic studies as needed.

(3) Combined with the actual situation of each province in the country, comb the risk list, formulate reasonable risk response measures, form a risk response guide for enterprise data center construction, provide counseling and support for data center construction, and effectively form a closed loop.

References

1. Interpretation of the "14th Five-Year Plan" Big Data Industry Development Plan 2021-12-01 10:45 Source: Ministry of Industry and Information Technology website （http://www.gov.cn/zhengce/2021-12/01/content_5655197.htm）
2. Jia Li. （2016） Risk assessment of the general contractor under the EPC model: A case study of a science and education information park project in Guangxi. Business & Technology, Monthly Journal of Finance and Accounting: 95-100.
3. Risk Analysis - MBA Think tank encyclopedia (https://wiki.mbalib.com/wiki/risk analysis)
4. Shenzhen Sichuang Planning Consulting Co., Ltd Shenzhen Feasibility Study Report Basics——Risk Prevention Measures (Shenzhen Feasibility Study Report Basics - Risk Prevention Countermeasures_Project_Loss_Planning (sohu.com)
5. What is risk transfer 2017-07-03 Source: Investor Home of the Securities Association of China （https://www.sac.net.cn/tzzyd/zqex/xxp/1j/201707/t20170703_131992.html）