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A Preliminary Study on the Construction of Enterprise Key Risk Indicator System

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Abstract: The uncertainty of the operation and development of many enterprises has been increasing due to the new global economic recession, resulting in the emerging risks accordingly. Enterprises urgently need more effective methods and approaches to carry out risk management, in order to improve the reaction sensitivity of risk identification and response. Establishing a risk early warning mechanism, especially the construction of its core key risk indicator system, may become one of the effective methods to help enterprises respond to risks rapidly. This paper will discuss how to construct the key risk indicator system, and further explored the application of key risk indicators in combination with the particular cases.

Keywords: Risk early warning mechanism, Key risk indicator (KRI), Tolerance range.

1. Introduction

The COVID-19 pandemic has swept the world, and most countries are encountering different degrees of economic recession threat. The risks in the economic and social macro level will be decomposed, and subsequently transmitted to the enterprises level in the relevant industrial chains. Due to the increasing uncertainty of operation and development, all related industries need time to adapt and to master the laws of survival and sustainable development. The breaking out of emerging risks and the rapid transmission of risks are typical characteristics of the economy in the current era, and any tiny carelessness may lead to a fatal blow for enterprises. This has brought the severe challenge to enterprises' risk identification and response capability.

The construction of risk early warning mechanism can effectively improve the risk identification and response capability of enterprises, which is one of the effective means for enterprises to conduct risk prediction and control, reduce the likelihood of risk occurrence, and minimize the impact of risks. Risk early warning mechanism is not a new term for management. Risk early warning mechanism has been applied and developed in many industries, and has attracted extensive attention in recent years. Coming with the era of "Big Data", the need for risk early warning becomes an inevitable trend of enterprise risk management. It is not only regarded as a valuable device for improving efficiency and effectiveness, but also a useful tool for decision-making together with the incident and loss management. The scope of risk early warning mechanism normally consists of: determining the sensitive indicators for risk early warning according to the characteristics of risks, monitoring and measuring risks prioritization and their change trend by collecting periodical data, evaluating the risks' deviation degree from the early warning baseline, and transmitting early warning signals to the decision-makers for prevention. (Zeng Yongquan, 2015) Hence, a key work for establishing the risk early warning mechanism is to build up the sensitive indicators system for evaluating risk factors, namely, the key risk indicators system. This paper will focus on how to construct the key risks indicators system.

2. What is Key Risk Indicator (KRI)

Risk control, Risk profiling and Key risk indicator (KRI) are three major techniques to assist organizations to identify, assess and monitor risks. Risk control is the most common tool for monitoring risks in a historic view. Risk Profiling, which monitors risks in a future view, is to initially identify the risks coming in the next few months and the severity of those risks. While key risk indicators (KRI), in a current view, are metrics being used to monitor risk exposure in a real time basis, where possible providing an early warning signal that a risk is more likely to occur or a control is deteriorating. KRI just like the dashboard of a car, providing us with early warning information such as whether the car is overspeeding, or whether the fuel is about to run out. KRI system plays the role of the early warning indicator to reflect the status of risk change and alert decision-makers to take prompt reaction accordingly.

The construction of KRI system is to establish a set of risk early warning indicators for the core risks after risk assessment. Key risk indicators have some fundamental characteristics. Firstly, they are regular, whose parameters can repeatedly reflect the change of risk characteristics, so as to identify the current level of a risk. Secondly, they are predicable, which can be observed or calculated, so as to demonstrate the change trend for the level of a risk. Thirdly, they are measurable, which can be used to measure a risk and record the result, so as to provide early warning signals. Fourthly, they are indicative, which can indicate the direction for decision-makers to take early action, so as to prevent or reduce loss. Fifthly, they are attributable, which are related to the root causes of a risk. (Zeng Yongquan, 2015)

The above characteristics determine that certain essential factors must be considered when constructing the KRI system. In the first instance, the properly defined KRI should be linked to the root cause, consequence or impacts of key risks identified by the management periodically, instead of independently existing. Therefore, only when the core risks are selected, and are judged to be appropriate to set sensitivity indicators, can the KRI be set.

In the next place, only when the indicators are quantifiable and their criteria of measurement are clear, can the rationality in selection and setting of KRI be confirmed.

Moreover, KRI should be supported by sufficient and sustainable data. If an enterprise has not established sustainable data source, or the collection and extraction of data are costly, the quantitative evaluation will still be a hard nut to crack. Meanwhile, experience has proved that, the powerful IT data support is one of the key success factors in constructing the KRI system. Simply relying on manually recorded data, the construction is often less satisfactory.

Furthermore, the reasonable tolerance ranges are needed to be set up for KRI. Ernst & Young argues that tolerances are a mechanism for articulating and setting risk appetite at a granular level. (Ernst & Young, 2010) Tolerance represents the attitude of management to consider the current status of a KRI is acceptable, raised concern or unacceptable. Usually, the acceptable range is defined as 'green', the raised concern range is 'yellow' and the unacceptable range is 'red'. It is emphasized that, tolerance should properly reflect the management's own risk appetite instead of simply copying any successful cases from other enterprises. Otherwise, it might lead to the wrong early warning and the miss of the best opportunity to deal with risk, accompanying with the waste of management resources.

Last but not least, an appropriate reporting mechanism should be established for the KRI system, to adequately provide in-time early warning signals to management. Reporting mechanism can be varied for different enterprises, depending on their hierarchy or existing common reporting mechanism.

3. How to Identify KRI

People used to involve in identifying KRI often wonder why KRI is so similar to key performance indicator (KPI). Can they be mutually used? What are the differences and connections between them? How do we accurately identify KRI?

Ernst & Young proposed a "Consolidated Strategy-Performance-Risk management Framework" (see Diagram. 1). This framework, although relatively abstract, has systematically clarified the relationship between performance management and risk management, and thus revealed the fundamental relationship between key performance indicator (KPI) and key risk indicator (KRI). In this framework, performance management and risk management both serve for strategic management. Performance management is to create value, while risk management is to protect the value created by performance management. "In order to balance risks and opportunities correctly and to obtain the best possible alignment of performance management and risk management, each KRI should be linked to a key performance indicator." Said Ernst & Young in its paper Risk appetite, the strategic balancing act.

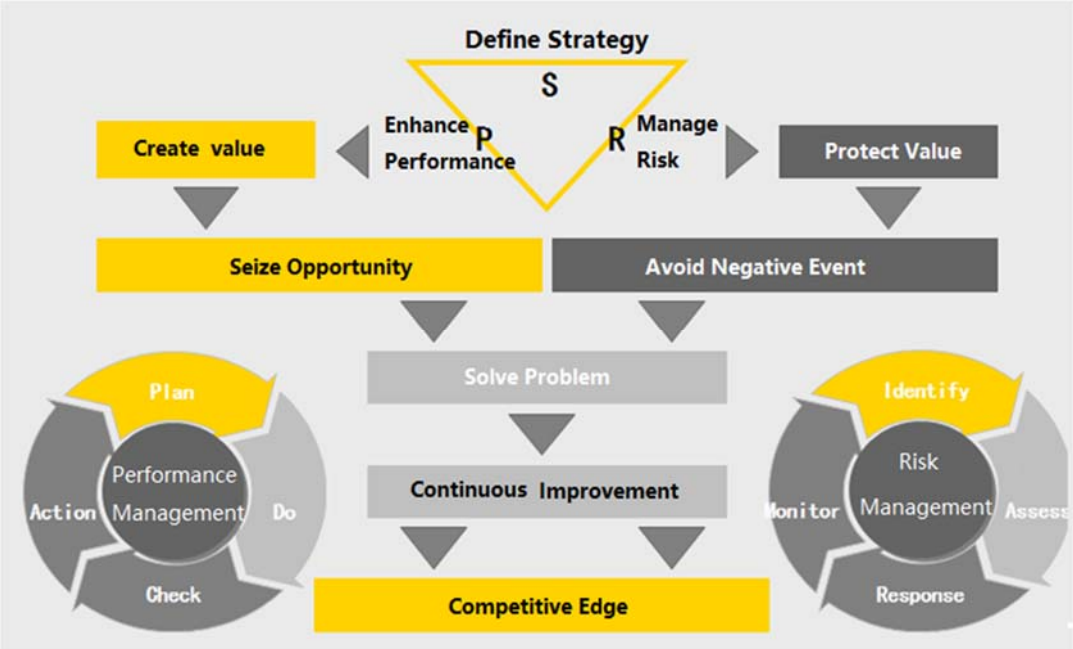

Figure 1. Consolidated Strategy-performance-risk management Framework

The overall strategic objectives of an enterprise is often decomposed into specific business objectives, and KPIs are linked to the business objectives to reflect the key drivers that can most effectively affect the enterprise value creation. (Parmenter, 2015) KRIs represent the sensitive factors that influence the realization of KPIs, and demonstrate the range of pressures faced by the core business in a developing trend, e.g. Asset loss rate per hundred million dollar, Crime rate per ten thousand people, System downtime, Customer complaint rate, etc. To reduce risks to the tolerance levels, enterprises should design a series of Key Control Activities (KCA) to control the risks. (See Diagram. 2: KPI-KRI-KCA Logic Relation for details).

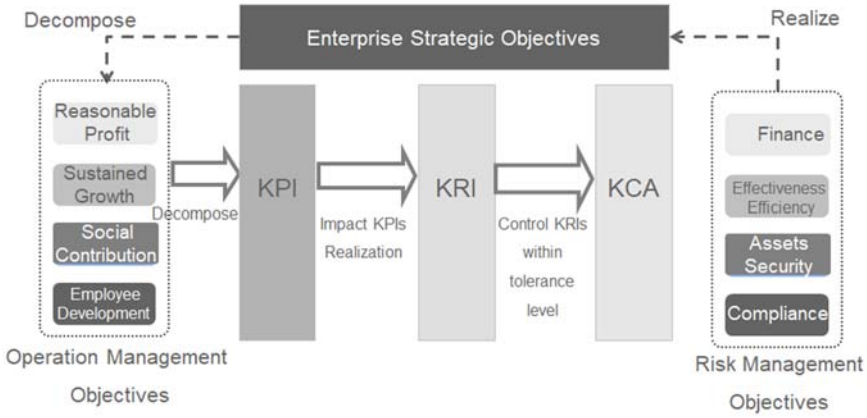

Figure 2. KPI-KRI-KCA Logic Relation

Taking the two risks of "fierce competition for industry resources" and "brain drain in key positions" as examples, which are common for various types of enterprises, the corresponding Logic Relation Diagram of KPI, KRI and KCA is as follows:

Risks	Key Performance Indicator (KPI)	Key Risk Indicator (KRI)	Key Control Activity (KCA)
Fierce competition of industry resources	1. Success rate of resource competition projects within three years	1. The number of new investors entering the industry within three years 2. Capital scale newly entered into the industry within three years	1. Develop a reasonable resource competition strategy 2. Arrange competent personnel to conduct government relationship maintenance and business negotiation
Brain drain in key positions	1. Number of staff loss for key positions in a year 2. Vacancy filling rate after staff loss of key positions 3. Average recruitment time for key positions 4. Among all the staff in key positions left the company, the proportion of staff persuaded to leave or downsized by the company, and the proportion of staff resigned voluntarily	1. The number of staff loss due to salary dissatisfaction and its proportion in the total number of staff loss in key positions 2. Growth rate of employees who still leave and accept job offer of competitors after salary negotiation 3. The number of key positions without successors within three months after resignation 4. Difference ratio between key position compensation & benefit package and market price 5. The ratio of key positions personnel whose performance evaluation, salary and bonus below the average level of the company 6. The ratio of backup personnel of key positions to key personnel in key positions 7. Changes in demand and supply of talents for key positions in the market	1. Competitive and incentive compensation & benefit package 2. Appropriate performance evaluation criteria and fair performance evaluation process 3. Establish relevant documentation of job responsibilities and business scope for key personnel 4. Establish a bonus mechanism linked to the ability and performance 5. Develop a training mechanism for potential key positions, so as to find replacement in a timely manner after key employees leave their jobs 6. Review and update key positions regularly 7. Conduct regular research and analysis on the demand and supply of talents in the market for key positions 8. Career planning for key position personnel 9. Regular analysis and monitoring of the compensation & benefit level comparing with the market

Since KRI are closely related to KPI, enterprises can often use their business objectives and corresponding KPI to deduce KRI when identifying and setting up KRI. For example, the strategic objectives of a consumer goods enterprise have changed in the past three years. Considering that the consumption capacity of young people has greatly improved in recent years, the company has changed its target customers from middle-aged and old people to young generation, and has taken measures such as launching products suitable for young people and increasing advertisement for young people. The relevant KPI set by the company is "the proportion of customers under the age of 45". The change of strategic objectives may cause certain potential risk factors, for example, the outflow rate of old customers is higher than expected because they feel abandoned, also, new products cannot meet the requirements of the young generation, leading to the loss of new customers. For such risk factors, the KRIs can be set as "old customer loss speed" and "new customer loss rate".

When determining KRI, it may be difficult to accurately judge whether some quantitative indicators belong to KRI or not. The following four indicators of a financial institution are taken as examples to specify which indicators are suitable for KRI and which are not:

Name of Indicator	Considerations	
Return on Assets	Indicator Calculation Formula	After-tax profit / [(Amount of assets at the beginning of the year + Amount of assets at the end of the year) /2] * 100% *(12/N) (where: N refers to the number of months of current period in which the indicator is calculated)
	Indicator Type	Key Performance Indicator (KPI)
	Judgement Guidance	Return on Assets is an indicator reflecting the profitability of enterprise assets, namely KPI. This indicator can promote the overall improvement of production and operation management, and continuously improve the economic benefits of the enterprise. The higher the ratio, the better the enterprise's asset utilization efficiency, the stronger the profitability, and the better the operation management. However, this indicator can only reflect the operating benefit, but not directly reflect the likelihood of occurrence or the degree of impact for relevant risks in the operation, so it is not suitable to be used as KRI.
Non-performing-loan (NPL) Ratio	Indicator Calculation Formula	(Subprime loans+ Doubtful loans+ Loss loans)/All loans * 100%
	Indicator Type	Key Risk Indicator (KRI)
	Judgement Guidance	The non-performing loan (NPL) ratio represents the proportion of non-performing loans in the total loan balance of financial institutions. Non-performing loans refer to the five categories of loans classified as normal, concerned, subprime, doubtful and loss, when evaluating the loan quality of banks and other financial institutions, among which the last three are collectively called NPL. This indicator is one of the important indicators to evaluate the security of credit assets of financial institutions, which reflects the risk that financial institutions cannot recover loans. The high non-performing loan ratio indicates that the risk of financial institutions recovering loans is high, otherwise, the risk is low. Therefore, this indicator is suitable as a KRI.
Loan loss reserve adequacy ratio (LLRA)	Indicator Calculation Formula	Actual provision for loans (referring to special reserve) / provision for loans * 100%
	Indicator Type	Control criterion for Key Control Activity (KCA)
	Judgement Guidance	Loan loss reserve refers to the provision prepared according to the degree of loan losses to cover special losses, possible losses that have not been individually identified, and the provision made for a country, region, industry or certain type of loan risk when there is objective evidence indicating that the loan has been impaired. The financial institution should analyze the recoverability of individual loans at the end of the period and estimate possible loan losses. This indicator reflects the activities of controlling the risk of "loan loss" by drawing loss reserves. Therefore, LLRA is a control criterion for the key control activity (KCA) to deal with risks, rather than a KRI.

4. How to Classify KRI

Referring to the property analysis method for sensitive indicators in macroeconomics, key risk indicators can be divided into two types: Predictive KRI and Lagging KRI, according to the time of risk change. Predictive KRI are the indicators that provide management with proactive notification that a risk may occur or a control may fail in advance of the event occurring. Lagging KRI are those indicators that provide information on the impact or frequency of risks which have occurred or the effectiveness of controls after a risk event.

As Predictive KRI can reflect the sensitive factors that may induce the occurrence of risks before they occur, they can usually be identified by analyzing how to control risk cause and how to implement preventative controls through business analysis process. Risk cause refers to those factors or events that increase the possibility of risk occurrence, while preventative control refers to the preventive assurance measures taken to reduce the possibility of risk occurrence.

Lagging KRI reflects the change trend after risk occurrence, and can often be identified from the aspects of risk impact/consequences, detective controls or recovery controls. The risk impact degree refers to the loss of and the impact on the organization once the risk occurs and is out of control. Detective control is the control exerted to find the risk that has occurred, while recovery control is the control to help the enterprise recover from the negative impact caused by the risk event.

Further illustration is as following for the two earlier mentioned risks of "fierce competition for industry resources" and "brain drain in key positions", regarding the nature and identification direction of their KRIs.

Risks	Key Risk Indicator (KRI)	Indicator Nature	Indicator Identification Direction
Fierce competition of industry resources	1. The number of new investors entering the industry within three years	Predictive KRI	Risk cause
	2. Capital scale newly entered into the industry within three years	Predictive KRI	Risk cause
Brain drain in key positions	1. The number of staff loss due to salary dissatisfaction and its proportion in the total number of staff loss in key positions	Lagging KRI	Detective control
	2. Growth rate of employees who still leave and accept job offer of competitors after salary negotiation	Lagging KRI	Recovery control
	3. The number of key positions without successors within three months after resignation	Lagging KRI	Risk impact degree
	4. Difference ratio between key position compensation & benefit package and market price	Predictive KRI	Risk cause
	5. The ratio of key positions personnel whose performance evaluation, salary and bonus below the average level of the company	Predictive KRI	Risk cause
	6. The ratio of backup personnel of key positions to key personnel in key positions	Predictive KRI	Preventative control
	7. Changes in demand and supply of talents for key positions in the market	Predictive KRI	Risk cause

5. How to Determine the Tolerance Range of KRI

The tolerance range of key risk indicators is a quantitative mechanism for articulating and setting risk appetite at a granular level. As discussed above, the tolerance range of a KRI can usually be divided into three levels, the green range (safety) is acceptable, the yellow range (warning) is raised concern, and the red light range (danger) is unacceptable. The critical value of these ranges is called "threshold". Where a threshold is exceeded, actions should be taken to escalate and remediate the risk or control back to the desired tolerance range, which is remarked as the green range. Each KRI may have its own exclusive tolerance range. Diagram 3 gives the examples for three major styles of tolerance range.

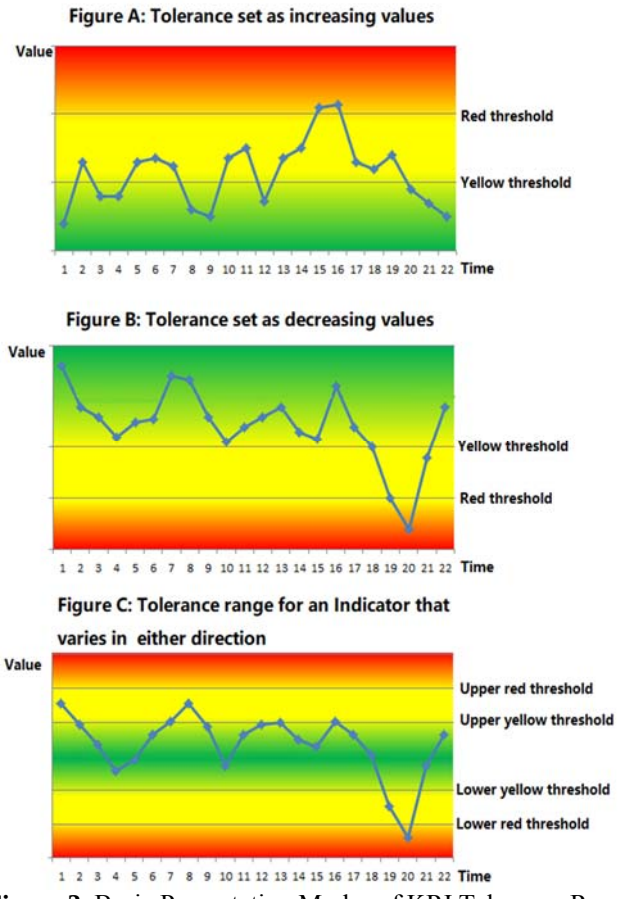

Figure 3. Basic Presentation Modes of KRI Tolerance Range

In the above diagram, Figure A demonstrates that an increase of a KRI means the increase of risk or deterioration of control. Figure B is opposite, where a decrease of a KRI means risk is increasing or control is deteriorating. Figure C illustrates that if the indicator is moving significantly to either upper or lower direction, risk or control is deteriorating.

The threshold of tolerance range can be derived from data and information from multiple perspectives, such as subjective judgment of management, historical data analysis, industry standards or competitor data, etc. Subjective judgment of management is a qualitative source, which is often adopted when historical data or industry standards are relatively limited. The threshold formed by this method should be verified for its applicability and relevance over a long period of time. When adopting historical data analysis to determine the threshold, it is often necessary to analyze the historical trend of data in the past period and find out whether the data trend is stable, whether it is affected by seasonal factors, etc., or set the data in combination with the risk events and losses that have occurred. Industry standards and competitor data are applicable to various situations, such as the enterprise's goal is to become the benchmark of the industry, or the enterprise needs to maintain a stable position in the industry, or the industry standards, laws or regulations are highly correlated with the enterprise's risks, etc.

6. Case Study – How to Set a Key Risk Indicator (KRI)

This chapter will discuss a case of setting KRI for the process of "Operation inventory management". Company A is a LNG import and processing enterprise, and its operational inventory stock are mainly the spare parts and materials required for operation and maintenance (hereinafter collectively referred to as "supplies"). Referring to the "Consolidated Strategy-performance-risk Management Framework" mentioned above, the management formulated the basic methodology for building KRI system: taking the company's strategic objectives as the starting point, referring to the key performance indicators (KPI) formed by the decomposition of the strategic objectives, and based on the risk list that the company identified in the earlier stage, set the key risk indicators (KRI) for the selected core risks, and use the company's historical data, industry data, management judgment and other reference values to formulate the tolerance range of the KRI. The relevant work can be carried out in six steps, as illustrated in Diagram 4.

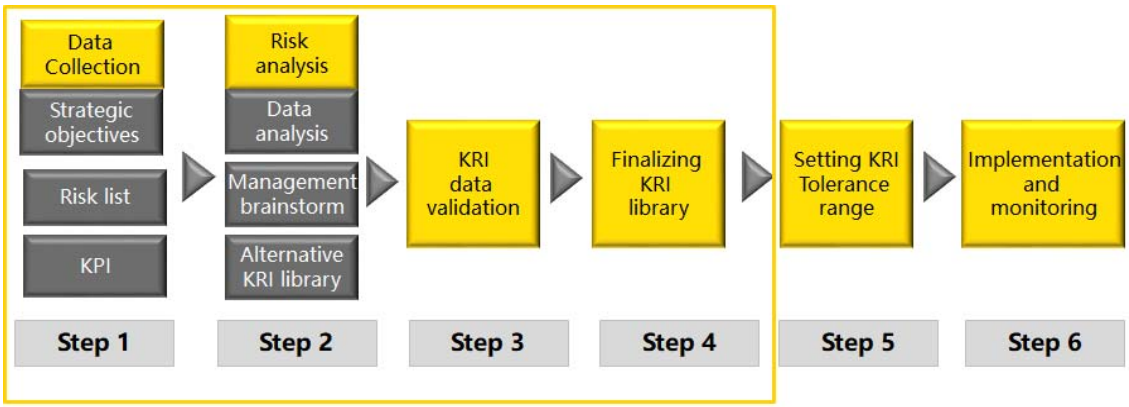

Figure 4. Steps for setting KRIs

(1) Selection of pilot business process and key risks

Based on the analysis of the key concerns of the management in recent five years and the results of the risk assessment at the company level in each year, it is believed that "Operation inventory management" process can be selected as the pilot business process to set key risk indicators. Company A began to carry out the centralized management of spare parts and materials two years ago, while the inventory management process and structure are still under continuous optimization. Issues such as inventory turnover, storage costs, the defective goods, the obsolete supplies and the dead stock are the management's critical concerns for this business process. Management reviewed the company-level risk list and observed that the risk called "low inventory turnover and occupation of company funds" had remained on the list for the recent 3 years. The inherent risk level of this risk has risen from "medium" to "high" in previous years, while the corresponding internal control design effectiveness is "medium" and the implementation effectiveness is "low", so the residual risk level is still "high" in this year. Correspondingly, in terms of performance management, on the basis of emphasizing operational reliability in previous years, the company added some KPIs for cost control, such as "the proportion of the original value of inventory supplies to the original value of operation fixed assets to be less than x %" and "the amount of the original value of inventory supplies to be reduced by x %" for the first time this year.

Before setting KRI, the management assigned the internal auditors to conduct an internal control effectiveness audit on "Operation inventory management" process, with the audit scope including five important sub-processes: purchase requisition, warehouse inbound and acceptance, storage and inspection, warehouse outbound and utilization, and disposal. The auditor finally identified 24 risk points and 46 key control points in total. The audit result showed that the deficiency rate of internal control design is 3%, while the deficiency rate of internal control implementation is 41%. Therefore, the future focus for improvement is to develop measures to enhance the effectiveness of internal control implementation.

(2) Setting and selection of KRI

Referring to the internal control audit result and using Delphi method to analyze the cause of the selected risk "low inventory turnover and occupation of company funds", the management determined that the following three factors related to inventory control should be considered first when setting KRI:

Consideration for KRI Setting	
S/N.	Description
①	Whether the parameters set for safety stock and repurchase point in the system is reasonable and whether they are in line with the procurement cycle.
②	Whether the actual requisition of supplies utilization is consistent with the work plan, and whether there is a decrease in the quantity of utilization or a delay of the requisition time, thus increase the inventory or stock age.
③	Whether "First-In, First-Out" principle is followed, and whether priority is given for the supplies with longer stock age when warehouse outbound.

Secondly, if the standing stock is insufficient, it may affect the daily inspection and maintenance of equipment and the implementation of emergency repair, which will have negative impact on the stability of the company's production and operation. Consequently, the following 2 factors related to stable operation should also be considered:

Considerations for KRI Setting	
S/N.	Description
④	Whether the quantity of standing stock is stable above the safety stock level.
⑤	Whether the standing stock can be replenished in a timely manner when they are lower than the Reorder Point (ROP).

According to the above five factors, the management designed three key risk indicators. To simplify the logic of expression, the following tables are presented:

KRI 1: Safety Degree of Inventory Balance

Indicator definition	The difference between the inventory balance of standing stock and the quantity of ROP and safety stock.
Indicator Nature	Predictive KRI
KRI application scenario	In the inventory balance report of the stock management system, the KRI is set for each kind of standing stock.
Value of KRI	When viewing the inventory balance report, users can use this indicator to judge the urgency of the purchase demand of each standing stock material on the report date, so as to timely find which standing stock materials need to be purchased and the urgency of their purchase demand. On the one hand, this indicator can be used to assist in the management of the implementation of "Reliability" KPI, on the other hand, it can remind users to timely and reasonably arrange purchase requisition to reduce the occurrence of emergency procurement.
Attention	Whether the parameters set for safety stock and Reorder Point (ROP) in the system are reasonable and whether they are in line with the procurement cycle. ④Whether the quantity of standing stock is stable above the safety stock level. ⑤Whether the standing stock can be replenished in a timely manner when they are lower than the ROP.
Calculation formula	Both sub-indicators X and Y should be considered: 1. X= Balance of standing stock - Safety stock quantity; 2. Y= Balance of standing stock – ROP.

Tolerance Range of KRI 1	Threshold	Description
Green Light Range	X≥0, and Y>0	The inventory balance of this material is not lower than the safety stock, and it is not necessary to purchase.
Yellow Light Range	X≥0, and Y≤0	If the material is not purchased immediately, the inventory balance may fall below the safety stock. (If a purchase requisition equal to the economic order quantity is submitted at this time, and the inventory may have been consumed below the safety stock level when the purchased arrives.)
Red Light Range	X<0	The quantity of the material in stock is already lower than the safety stock, and it needs to be purchased immediately.

KRI 2: Stock age of the supplies at the latest outbound

Indicator definition	The difference between the latest outbound delivery date and the initial inbound receipt date of a batch of extraordinary stock supplies (counted in days).
Indicator nature	Lagging KRI
KRI application scenario	In the inventory balance statement generated by the material management system, the key risk indicator warning is given to each batch of extraordinary stock.
Value of KRI	The principle of "purchase on demand, no inventory left" should be adopted for the non-emergency stock supplies. This KRI can visually reflect the timeliness of each batch of extraordinary stock supplies, and can judge the difference between the actual requisition and the use plan of extraordinary stock supplies in association with the information such as inventory balance and stock age, etc. The user can judge the degree of idleness of the extraordinary stock supplies by consulting the inventory balance report, identify the possible situation that the supplies are not collected according to the plan, and remind the user to further prepare the supplies collection plan and purchase requisition in the future.
Attention	Whether the actual requisition of supplies is consistent with the work plan, and whether there is a reduction in the quantity of supplies or a delay of collection, resulting in the increase of inventory or stock age.
Calculation formula	Calculated by batch: X = Last outbound date of extraordinary stock supplies - Inbound date of the batch

Tolerance Range of KRI 2	Threshold	Description	Remarks
Green Light Range	0 day≤X≤180 days	The requisition and outbound of extraordinary stock supplies of the batch is completed within half a year after its warehouse entry.	If the value is lower than “0”, it indicates that “the inbound record of this batch of supplies is inaccurate and cannot be used for calculation”.
Yellow Light Range	180 days<X≤360 days	The requisition and outbound of extraordinary stock supplies of the batch is completed within one year after its warehouse entry.	
Red Light Range	X>360 days	The requisition and outbound of extraordinary stock supplies of the batch is completed over one year after its warehouse entry.	

KRI 3: The compliance degree of handling the warehouse outbound of supplies according to “First In, First Out” principle

Indicator definition	For the same material, the difference between the stock age of the latest outbound and the stock age of the earliest batch in the inventory balance (calculated by days)
Indicator Nature	Predictive KRI/Lagging KRI
KRI application scenario	Predictive KRI: The interface of material management system for handling outbound of supplies, the system interface will give the corresponding risk indicator warning after selection of the batch for warehouse outbound; Lagging KRI: In the Warehouse outbound details statement generated by the material management system, each row of outbound records is given a key risk indicator warning.
Value of KRI	This KRI can visually identify the supplies that have not been collected and delivered in accordance with the "First In, First Out" principle (whether this outbound batch is the batch with the longest inventory age). By viewing the inventory balance statement, on the one hand, users can identify which supplies are not collected according to the "First In, First Out" principle, and remind the users to pay attention to the future warehouse outbound, so as to reducing the stock age of the supplies. On the other hand, it helps users to find obsolete supplies (that is, supplies with a long stock age and no use value), and reminds users that they may need to make impairment judgment or disposal.
Attention	Whether “First-In, First-Out” principle is followed when the supplies are collected, and whether priority is given for the supplies with longer stock age.
Calculation Formula	X = Inbound date of each batch handled for outbound of the same supplies - Inbound date of the earliest batch in the supplies inventory

Tolerance Range of KRI 3	Threshold	Description
Green Light Range	X≤0 day	This outbound delivery of the supplies has followed the principle of "First in, First out".
Yellow Light Range	0 day<X≤180 days	The outbound delivery has not followed “First In, First Out” principle and the outbound priority is not given to the supplies with stock age difference less than half a year.
Red Light Range	X>180 days	The supplies have not been delivered according “First In, First Out” principle and the priority has not been given to the supplies with stock age difference more than half a year.

The above example demonstrates and analyzes three key risk indicators of the same risk from the basic elements to be considered in setting key risk indicators, such as indicator definition, nature, application scenario, value, calculation formula, and tolerance range. Due to the length of this article, the data validation process of indicators will not be exemplified.

7. Reporting, Monitoring and Follow-up Study Orientation of KRI

In order to make the key risk indicators reasonably and fully play their due role, it is necessary to establish a regular reporting mechanism. KRI should be included in the enterprise reporting system and reported to the management regularly every month or at least every quarter. The existing reports of the enterprise can be utilized, for example, the reporting content of KRI can be appropriately added to the existing corporate governance or risk management reports. The report should analyze KRI data and draw conclusions to help the management better understand the important information, change trends and relevant findings reflected by the indicators. Meanwhile, it is also necessary to make suggestions to the management what countermeasures should be taken when key risk indicators exceed the tolerable range. If KRI increases or decreases significantly, it is necessary to report to the management anytime, instead of waiting for the next regular reporting.

In addition to establishing a reporting mechanism, it is also necessary to continuously monitor KRI. Firstly, management should pay attention to the trend of indicator change, whether there is a situation where the indicator value has been maintained for a long time or the indicator has not changed but the enterprise still suffers losses. If such situation occurs, it may indicate that KRI is no longer applicable or relevant for a particular risk. Secondly, attention should be paid to whether the setting of KRI is consistent with the enterprise's awareness of risk and control. In order to confirm the consistency of the trend reflected, the key risk indicators can be compared with the data at the time of the risk event, or the predictive indicators can be compared with the lagging indicators of the same risk. Thirdly, threshold and tolerable range also need to be reviewed at least once a year to ensure they are appropriate overtime. If the tolerance range is unrealistic in the short term, management may need to consider a plan to achieve these tolerance in the medium-longer term, but have higher tolerance levels to begin with.

What this paper has discussed is just one of the schemes for building the key risk indicator system, which may need more effectiveness testing by practice and deeper study. Furthermore, there is still much space for optimization in identifying key risk indicators and setting early warning thresholds, for example: how to effectively use offline data not based on information systems to set indicators, and how to use more scientific statistical analysis methods to set warning thresholds and indicator formulas to improve data sensitivity, etc. By constantly exploring the above issues and seeking solutions, the key risk indicators will be more accurate in reflecting the risk changes trend, so as to improve the quality of the enterprises’ risk management strategies to mitigate emerging risks in the period of economic fluctuation.

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