Research on L Company's Intelligent Performance Evaluation System

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Abstract: Based on the development status of L company, combined with field research and theoretical research, this paper deeply analyzes the current cost control system and production process of the company on the basis of fully understanding the Performance evaluation system of L company.Put forward corresponding suggestions and opinions on existing problems, use mobile Internet of Things related technologies to propose corresponding solutions, and summarize their impact on the future management of L company. It is hoped that through the optimization and improvement of Performance evaluation system by L Company in the context of intelligent manufacturing.

1. Introduction

From the traditional Internet to mobile Internet, Internet technology is developing at a rapid pace, the future development trend and trend of the Internet is the era of Intelligent. Under the guidance of this era, combined with the traditional manufacturing L company with characteristics in the current era, and based on a large number of literature references and data integration analysis, the entire L company's Performance evaluation system and management structure are upgraded.

2. Company Overview

Since its establishment, L Company has always focused on the development, production and sales of water heaters. The company adheres to the service concept of customer first.After decades of development,. it is a large multi-functional water heater manufacturer and a very representative enterprise in the industry.

3. Currently Existing Problems

The company did not form a performance culture.Because the employee's job appraisers in the evaluation system set by the company are their department leaders, and because there are no specific and operational quantitative indicators, the evaluation of the employees' superiors depends largely on their subjective will.In the actual production process of L company, the production scale of each branch plant, the ratio of machine to manual work, the degree of new and old equipment are different, which results in the production inconsistency among different workshops.

In addition, the management leaders did not plan the overall production plan issued by the company in detail, lacked the time to arrange on time and on time, and the performance efficiency was difficult to optimize. On the other hand, the original problem of water heater parts and

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components is difficult to unify the standard, and the wages of workers are increasing, which directly leads to the problem that the Performance evaluation of products continues to rise.

4. Performance Evaluation System Construction

4.1 Intelligent Data Acquisition.

In view of the problems existing in L's existing equipment, it is possible to modify the data communication interface of various production equipment, and to network the equipment used for production and inspection, and install programmable logic controllers, sensors, controllers, actuators. Control systems and devices, such as logistics information and warehouse data from various processes and various equipments in the production process, and complete related data resources to establish a real-time database for production and equipment. Data analysis, query and statistics.

4.2 Intelligent cost data processing.

The resources of the enterprise cannot be reasonably allocated, and the business income cannot be scientifically allocated. As a core step in the development of the enterprise operation.If a company wants to improve its core competitiveness and develop its innovation capability, we will have to give full play to the role of accounting management, refine the accounting links and steps, strengthen the management and supervision functions of accounting, and ensure the rationality and accuracy of cost accounting.

This paper intends to build an information-based management platform for L company by means of Mobile Internet of Things. In different models, the corresponding indicators are determined according to the estimated balance sheet, profit statement and cash flow statement during the budget period.

4.3 Strengthen Performance Appraisal.

Setting Four Dimensions for Balanced Scorecard, specific steps are as follows.

Table 1 Financial Dimension Indicator Selection and Indicator Description

Dimension	Subdimension	Indicator selection	Indicator description
Finance	Profit	EVA/Capital investment	Proportional relationship
	Operation	Asset Turnover	Asset turnover in 1 year
	Debt service	Current ratio	Ratio is generally >2

Set the financial dimension.In the subsequent optimization process, the financial layer mainly decomposes the EVA index to find out the factors that have a greater impact on EVA in the decomposed indicators.Set the customer dimension. Please refer to Table 1 and Table 2.

Table 2 Customer Dimension Indicator Selection and Indicator Description

Dimension	Subdimension	Indicator selection	Indicator description
Customer	Product	Customer profitability	Customer Net Profit/Total Customer Cost
		Customer satisfaction	The higher the ratio, the better the service
	Relationship	Strategic customer ratio	Proportional relationship between the two
	Image	Market share	Compared with the corporate brand image
		Word of mouth rating	The higher the rating, the better the image

Then, set the internal business process dimension. Well-functioning internal processes are the basis for meeting the needs of existing and potential customers. Please refer to Table 3 for selection and indicator description.

Table 3 Internal Process Dimension Indicator Selection and Indicator Description

Dimension	Subdimension	Indicator selection	Indicator description
Internal process	Operation management	Rationality of product planning	Connection with subsequent production.
		1/ Purchasing days	Determined by the procurement plan.
	Innovation	R&D expenses/Sales revenue	Pay attention to the degree of technological innovation.
		Result conversion rate	The higher the better.
	Social process	1/Accidental casualty rate	Accident casualty rate = number of casualties / total number of employees
		Community satisfaction	Corporate social responsibility is strong, the community is satisfied with this

Table 4 Learning Growth Dimensional Indicator Selection and Description

Dimension	Subdimension	Indicator selection	Indicator description
Learning Growth	Human Resources	Staff training rate	Number of employees in the statistics period / total number of employees
	Organizational resources	Target completion	The higher the degree of completion, the stronger the organization management ability
		Inter-departmental coordination	Communicate with each other and efficiently complete tasks
	Information resource	System satisfaction	The system has been implemented to meet the company's management needs
		System coverage	Implemented information system point/enterprise implementable information system point

Finally, set the learning and growth dimension. The learning growth dimension mainly considers the integration of intangible assets owned by enterprises and their supporting role in strategy. The intangible assets of an enterprise can be broadly divided into three categories: human resources, organizational resources, and information resources. Please refer to Table 4 for the selected learning growth dimension indicators and indicators.

4.4 Calculating indicator weights based on AHP.

The determination of the weight of each level of indicators plays an important role in the entire evaluation system. We designed a questionnaire and sent a total of 500 questionnaires, of which 400 were collected, and the number of questionnaires valid for weights was 260.

Use AHP to calculate index weights, judge which dimensions are more important, and quantify the importance according to expert opinions and relevant literature. For the evaluation scale of AHP, please refer to Table 5.

Table 5 Evaluation Scale of Analytic Hierarchy Process

Scaling	Meaning
1	Compared with the two indicators, the two are equally important
3	Compared with the two indicators, the former is slightly more important than the latter.
5	Compared with the two indicators, the former is more important than the latter.
7	Compared with the two indicators, the former is more important than the latter.
9	Compared with the two indicators, the former is extremely important than the latter.
1/3	Compared with the two indicators, the former is slightly less important than the latter.
1/5	Compared with the two indicators, the former is less important than the latter.
1/7	Compared with the two indicators, the former is less important than the latter.
1/9	Compared with the two indicators, the former is less important than the latter.

Note:2,4,6,8,1/2,1/4,1/6,1/8 is the intermediate value of the above scale.

Establish judgment matrix based on company situation. The evaluation system includes four dimensions: finance, customer, internal process, and learning growth. There are sub-dimensions and related indicators under each dimension. Dimensional judgment matrix, please refer to Table 6.

Table 6 Dimensional Judgment Matrix

Dimension	Finance	Customer	Internal Process	Learning Growth	Weights（%）
Finance	1	1/2	4	3	25.71
Customer	2	1	7	5	47.85
Internal Process	1/4	1/7	1	3	21.13
Learning Growth	1/3	1/5	1/3	1	5.31

Conformance test based on the above calculation results.Calculate the consistency index of the matrix:

$$\mathrm{CI} = \frac{\lambda max - n}{n-1} \quad (1)$$

Where λmax represents the largest eigenvalue of the matrix and n represents the order of the decision matrix.The indicator is to determine the consistency by checking whether the largest eigenvalue of the matrix is close to or equal to the order of the matrix.Need to adjust the number in the matrix to meet the consistency requirements of the analytic hierarchy process.

Table 7　Mean Random Consistency Index

N	1	2	3	4	5	6	7	8	9
RI	0.00	0.00	0.92	1.90	1.32	1.14	1.22	1.31	1.35

Finally, calculate the consistency ratio CR according to the formula：

$$\mathrm{CR} = \frac{CI}{RI} \quad (2)$$

In general, if the CR is less than 0.1, this means that the matrix has passed the consistency test and is acceptable.If the CR is greater than 0.1, the matrix needs to be adjusted until the consistency

check is passed.

Table 8 Weight of Performance Evaluation System Index

Dimension	Weights	Subdimension	Weights	Indicator selection	Weights
Finance	25.71%	Profit	17.51%	EVA/Capital investment	17.51%
		Operation	4.13%	Asset Turnover	4.13%
		Debt service	4.07%	Current ratio	4.07%
Customer	47.85%	Product	30.71%	Strategic customer ratio	8.58%
				Customer satisfaction	22.13%
		Relationship	6.29%	Strategic customer ratio	6.29%
		Image	10.85%	Market share	9.90%
				Word of mouth rating	0.95%
Internal process	21.13%	Operation management	2.91%	Rationality of product planning	1.31%
				1/ Purchasing days	1.6%
		Innovation	2.52%	R&D expenses/Sales revenue	0.63%
				Result conversion rate	1.89%
		Social process	15.70%	1/Accidental casualty rate	10.68%
				Community satisfaction	5.02%
Learning Growth	5.31%	Human Resources	1.42%	Staff training rate	1.42%
		Organizational resources	1.77%	Target completion	1.68%
				Inter-departmental coordination	0.09%
		Information resources	2.12%	System satisfaction	1.58%
				System coverage	0.54%

The maximum eigenvalue of the dimension layer is $\lambda max=4.2617$, the consistency index CI=(4.2617-4)/3=0.0872, and the consistency ratio CR=0.0872/0.9=0.0980<0.1, indicating that the consistency of the judgment matrix is acceptable.determine the weight of each level of indicators.Please refer to Table 8 for the weight of each indicator in the performance evaluation system.

Through AHP, the weights of each indicator subdivided by the financial perspective dimension, the customer dimension, the internal business process dimension, and the corresponding sub-dimensions under the learning and growth dimension can be calculated.

The performance appraisal analysis model based on AHP is intuitively presented to various management, ordinary employees and even end users through various visualization tools. With each “Amoeba” as the core, all employees can make online decisions and form liquidity management.

5. Summary

In view of the actual situation of L company, this paper suggests that L company can set up an inter-functional group to implement the organizational structure, promote the cooperation of various units, comprehensively use internal technology, manpower, equipment and other resources, strengthen cooperation with external alliances, and introduce scientific research and scientific research personnel. Actively cultivate the working ability of employees.Use financing leases to replace old equipment and realize equipment intelligence to obtain real-time data.As a major technical carrier and driving force of the industrial Internet, mobile internet has made it possible for enterprises to develop from digital industrialization to industrial digitalization.

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