

Case Study on Information Technology Service Management Process Evaluation

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Abstract. After analyzing the IT service management framework and associated processes of MK company, various indicators of IT service management process are identified. The weight of each indicator is calculated with analytical hierarchy process, and the evaluation was executed in MK company. And the suggestions are proposed with consideration of both the evaluation results and the real situation of MK company's IT service management.

Keywords: Information Technology Infrastructure Library; Information Technology Service Management Process; Analytical Hierarchy Process

1. Introduction

Information Technology Service Management (ITSM) based on Information Technology Infrastructure Library (ITIL), which integrates the best practices of global IT management and forms the normative truth standard to reduce effectively cost and improve the quality of service, is applied widely in the world[1].

2. MK Company and its IT Service Management

MK is a professional service company with a global network, specifically providing financial audit tax and consulting services. MK company has more than a dozen subsidiaries in Beijing, Tianjin, Dalian, Shanghai, Nanjing, Chengdu, Hangzhou, Guangzhou, Changsha, Shenzhen, Hong Kong SAR and Macao SAR, with over 8,000 professionals. MK' IT department is an independent department, constituting the company's basic structure with personnel, administration, marketing, training, and finance department. IT department's main responsibilities include planning, constructing and maintaining company's hardware and software of computer system, developing IT system's security policies, monitoring the company's network applications, backup company's data and planning and procuring computers, printers and other consumable goods for the company.

The range of IT application management service that MK company provides, covers the user's application system, database performance and monitoring, data backup and so on, such as: (1) Application service management: Incident Management, Problem Management, Configuration Management, Change Management and Knowledge Management. (2) Technical support: Configuration Installation, Service Upgrading, Application Incident Management, Ordinary Onsite Maintenance and Operation Supporting Service. (3) Monitoring management: Monitoring Service and Application Performance Management Service.

3. Analysis on MK Company's IT Service Management Processes

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This section analyzes MK company's IT service management process in the views of customer satisfaction management, operation maintenance service process, IT service financial management, service level management and IT service implementation management process. It is believed that all IT service management processes should be aimed at enhancing customer satisfaction.

Customer satisfaction management is an organizational behavior that enterprises try to understand customer satisfaction through investigating, analyzing and researching, based on this, we identify the effect factors and continuously improve it. MK's solutions are as follows: (1) Developing the principles of customer satisfaction management from the concept level. (2) Formulating strategies from the technical aspect to improve customer satisfaction. (3) Focusing on customer value, and promoting satisfactory experience delivery. (4) Shortening service-response time, and providing continuous service. (5) Optimizing service cycle and saving cost.

The key roles of MK company's application system operation maintenance service team are as follows: (1) Operation director, who is responsible for controlling the quality of services, maintaining customer satisfaction, timely responding to users' new needs and reporting the situation of operation maintenance to the management. (2) Operation manager, who is responsible for managing the operation maintenance services team, keeping in touch with every department's heads, and ensuring to complete the operation maintenance support service with high-quality. (3) Operation maintenance service support team, including on-site operation maintenance service and support team and remote support team, who grantee the stable operation of users' application system together. The operation maintenance service processes mainly include service team, service process, management tool, fault prevention, emergency response system and so on.

MK company's IT service financial work includes defining the cost elements, and further subdividing the cost project. Define cost element structure in terms of service, that is, identify the cost based on determining the service element structure, distribute them to every service and sum up respectively. After determining the relationship between cost elements structure and service elements structure, service-based cost model would be established.

MK company's service level indicators are develops together with the customers. After reaching consent on the service level according to customer's requirements and actual situation, it will become one part of the contract, and is the basis of measuring the quality of operation maintenance outsourcing services.

All customer service content will be gradually tracked and handled electronically with special tools and customers' information will be stored in the form of database or table in MK company. The service processes will be regularly checked and tracked, and continuously optimized in order to improve service efficiency and quality, including incident management, problem management, change management, configuration management, helpdesk management, knowledge management and other processes.

4. IT Service Management Process Evaluation System of MK Company with AHP

There are five steps in Analytical Hierarchy Process (AHP) [2]: (1) To clarify the scope, policies to be adopted, guidelines for achieving objective, strategy and various constrains involved in decision planning, and determine the general goal by deeply understanding the system. (2) To establish a multi-level hierarchical structure, and to divide the system into several hierarchical levels in terms of different objectives and different functions. (3) To define the correlation degree between the elements of adjacent-level in the hierarchical structure by constructing the comparison matrix and matrix operation of mathematical method. (4) To calculate the elements' synthesis weight in each level for system target, and then sort totally, in order to determine the importance of the various elements at the bottom of the hierarchical structure to the general goal. (5) To consider the corresponding decision-making according to the analysis results.

According to the service level agreement of MK company's IT service management, we use the method of two-way communication with the experts. Firstly, the indicator system is designed with through repeatedly consulting experts, the key performance indicators of MK company's IT service management process framework are developed at last (TABLE I).

TABLE I. KM COMPANY'S IT SERVICE MANAGEMENT PROCESS ASSESSMENT INDICATOR SYSTEM.

First- grade indicators	secondary indicators
Configuration Management U1	U11 configuration database update frequency
	U12 the percentage of unauthorized use of IT facilities
	U13 the percentage of correctly updated configuration items
Service Level Management U2	U21 the service percentage involved in service level agreement
	U22 the monitoring and return frequency of service level agreement
	U23 the user's satisfaction degree with the agreement
	U24 the percentage of service reaching defined service level
	U25 the percentage of approving a new service with less than 30 days
	U26 the percentage of updating the service level agreement with less than 30 days
Help Desk Management U3	U31 help desk staff's training time
	U32 the number of customer complaints
	U33 the percentage of delayed response to service request
	U34 the percentage of service request records being correctly described
	U35 the percentage of the service request status being updated timely
	U36 the percentage of correct record of help desk personnel
Emergency Management U4	U41 the percentage of emergency being resolved within the time defined by service level
	U42 the percentage of problem management processes triggered by emergency
	U43 the percentage of the emergency recorded by help desk
	U44 the percentage of recurring emergency
Change Management U5	U51 improving the efficiency of dealing with change requests
	U52 the number of emergency caused by change
	U53 the percentage of successful implementation of change requests
	U54 user testing passing rate within the specified time
	U55 the delayed time of change implementation
	U56 the percentage of complete change document
Problem Management U6	U61 improving problem solving efficiency
	U62 the percentage of known problems
	U63 the number of repeating problems
	U64 the growth rate of problem numbers after emergency occurred
IT Service Financial Management U7	U71 reasonable cost analysis
	U72 the accuracy of measuring IT service delivery costs
	U73 the timeliness of payments

5. Determine the Weight

First, we invites 10 experts, including the IT director, technical manager, IT information technology specialists, system pre-designer and users, to score the judgment matrix, and then calculates the average value, constructs judgment matrix. For the convenience of calculation, the average value is round number.

The judgment matrix of first-grade indicators is illustrated in TABLE II. The Expert Choice software is used to calculate the weight, getting the results: Configuration Management (U1, 0.137), Service Level Management (U2, 0.244), Help Desk Management (U3, 0.334), Emergency Management (U4, 0.075), Change Management (U5, 0.061), Problem Management (U6, 0.050) and IT Service Financial Management (U7, 0.099). Finally, the consistency test is done, the $CR = 0.07 < 0.1$, therefore, it can be concluded that the matrix is acceptable. The weights of 32 secondary indicators are worked out by calculating their corresponding weight respectively (TABLE III).

TABLE II. FIRST-GRADE INDICATORS JUDGMENT MATRIX.

	U1	U2	U3	U4	U5	U6	U7
U1	1	5	1/3	4	6	6	5
U2	1/5	1	1/4	3	4	4	4
U3	3	4	1	3	5	4	4
U4	1/4	1/3	1/5	1	3	2	2
U5	1/6	1/4	1/5	1/3	1	3	3
U6	1/6	1/4	1/5	1/2	1/3	1	1
U7	1/5	1/4	1/2	1/2	1/3	1	1

TABLE III. THE RESULT OF IT SERVICE MANAGEMENT PROCESS EVALUATION.

main processes	value
Configuration Management	0.137
Service Level Management	0.244
Help Desk Management	0.334
Emergency Management	0.075
Change Management	0.061
Problem Management	0.050
IT Service Financial Management	0.099

6. MK Company's IT Service Management Process Evaluation

The MK company's core staffs were invited to evaluate the configuration management, service level management, service desk management, emergency management, change management, problem management and configuration management, and finally obtain the evaluation value (TABLE IV). It is found that the most concerned areas in the IT service management are help desk management, configuration management and service level management, so that we can determine priorities for project implementation.

With evaluating IT service management and comparing traditional IT work pattern with new ITIL management style, we can draw the following suggestions for improvement: (1) IT work pattern will become active mode from the traditional passive mode: the computer problematic events are presented by the user, and help desk allocates tasks according to each IT worker's ability, establishing resolution with IT. The original unordered passive mode was gradually transformed to ordered active way. (2) To avoid malicious use of IT resources: traditional IT work pattern allows for user's malicious use of IT resources. After the implementation of ITIL, it will help to avoid malicious use of IT resources. (3) To reduce the loss of events: under the traditional mode, the event would be recorded by each IT staff member, which easily causes the loss of incidents. Implementation of ITIL will let help desk track and record the entire event process, ensuring practical resolution of users' problems. (4) To share IT resources: some staffs are scattered, which leads to ineffective improve efficiency and reduce costs. After the situation, thus companies have a wide range of IT management, and share of resources among IT staff and finally causes that some IT staff are busy chronically, while other IT staff cannot play their role. Once ITIL is implemented, help desk will allocate computer events to every region's IT staff according to actual the IT resources can be shared. (5) To implementation of ITIL, IT resources will be fully shared, so the existing IT resources can cover a larger area, at the same time realizing the goal of improving efficiency and reducing IT costs. (6) To maintain a stable system and provide the necessary platform for MK business: the implementation of ITIL will enable the MK company to plan the network platform from the perspective of management, and to reach a stable state.

TABLE IV. WEIGHT OF ALL INDICATORS

No.	first-grade indicators	weight	No.	secondary indicators	secondary indicators weight
U1	Configuration Management	0.137	U11	configuration database update frequency	0.037
			U12	the percentage of unauthorized use of IT facilities	0.016
			U13	the percentage of correctly updated configuration items	0.084
U2	Service Level Management	0.244	U21	the service percentage involved in service level agreement	0.029
			U22	the monitoring and return frequency of service level agreement	0.064
			U23	the user's satisfaction degree with the agreement	0.107

			U24	the percentage of service reaching defined service level	0.033
			U25	the percentage of approving a new service with less than 30 days	0.014
			U26	the percentage of updating the service level agreement with less than 30 days	0.011
U3	Help Desk Management	0.334	U31	help desk staff's training time	0.017
			U32	the number of customer complaints	0.131
			U33	the percentage of delayed response to service request	0.072
			U34	the percentage of service request records being correctly described	0.035
			U35	the percentage of the service request status being updated timely	0.050
			U36	the percentage of correct record of help desk personnel	0.029
U4	Emergency Management	0.075	U41	the percentage of emergency being resolved within the time defined by service level	0.038
			U42	the percentage of problem management processes triggered by emergency	0.010
			U43	the percentage of the emergency recorded by help desk	0.008
			U44	the percentage of recurring emergency	0.020
U5	Change Management	0.061	U51	improving the efficiency of dealing with change requests	0.012
			U52	the number of emergency caused by change	0.007
			U53	the percentage of successful implementation of change requests	0.026
			U54	user testing passing rate within the specified time	0.009
			U55	the delayed time of change implementation	0.003
			U56	the percentage of complete change document	0.003
U6	Problem Management	0.050	U61	improving problem solving efficiency	0.022
			U62	the percentage of known problems	0.004
			U63	the number of repeating problems	0.015
			U64	the growth rate of problem numbers after emergency occurred	0.008
U7	IT Service Financial Management	0.099	U71	reasonable cost analysis	0.055
			U72	the accuracy of measuring IT service delivery costs	0.032
			U73	the timeliness of payments	0.012

7. Conclusions

With analyzing the IT service management framework and associated processes of MK company, various indicators of IT service management process are identified. The weights of each indicator are calculated with AHP, and MK company's IT service management is evaluated. Some reasonable suggestions are proposed with consideration of both the evaluation results and the actual situation of MK company's IT service management.

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9. References

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