

Implementation of Service Desk Solutions on the Example of a Company for the Production and Distribution of Electricity Energy Using the Principles of the ITIL Framework

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Abstract - ITIL stands for Information Technology Infrastructure Library. ITIL is the most famous framework for managing IT services. ITIL provides guidelines for the implementation of Service Desk solutions in the business environment of any company. The original scientific and professional contribution of this work is proof that the ITIL framework, through the implementation of a software solution that automates its business processes, can help every company in daily work and can improve its basic and additional business processes. Measurements will be made in a real public company in Bosnia and Herzegovina. Also, the software solution itself will be independently developed with its own original programming code only for the purposes of this research.

Keywords – ITIL v4, Incident Management, Service Desk, Problem Management, Change Management.

I. INTRODUCTION

ITIL provides a digital operating model that enables organizations to co-create effective value from their IT-supported products and services [1]. ITIL 4 builds on ITIL's decades of progress, evolving established ITSM practices for the wider context of customer experience, value streams, and digital transformation [3]. ITIL is an abbreviation of Information Technology Infrastructure Library, and it is today the most present framework for the management of IT services [2].

The service management practices in ITIL 4 include: Business analysis [4], Service catalogue management [5], Service design [3], Service level Management [1], Availability management [5], Capacity and performance management [4], Service continuity management [3], Monitoring and event management [5], Service desk [4], Incident management [2], Service request management [4], Problem management [3], Release management [5], Change management [4], Service validation and

testing [1], Service configuration management [5] and IT asset management [4].

Previous research in this area for ITIL Incident management include implementation of data services in telecommunication operator company [7], development of web application in computer laboratory [8], a proposal for implementation of incident management in SMEs [6]. Previous research in this area for ITIL Change management includes IT project change management [9], a methodology to manage the changing requirements of a software project [10], using enterprise architecture to guide application change management [11]. Previous research in this area for ITIL Service Desk includes Exploring service desk employee's motivation and rewarding [12], Integration of the Helpdesk system with messaging system [13]. Previous research in this area for ITIL Problem management include filtering techniques for the intervention planning problems case of incident management in ITIL context [14], implementing an ITIL-based IT Service Management Measurement System [15] and a conceptual model of IT Service Problem Management [16].

Section II. of the paper describes the business environment of the Company for production and distribution of electrical energy. Section III. of the paper describes measurements for Incident management, Change management, Service Desk and Problem management before the implementation of ITIL best practices. Section IV. describes measurements for Incident management, Change management, Service Desk and Problem management after the implementation of ITIL best practices. Section V. of the paper is a conclusion where are described benefits of the implementation of ITIL best practices and how these benefits have impact for improving business processes inside a Company for production and distribution of electrical energy.

II. BUSINESS ENVIRONMENT OF COMPANY

Company for production and distribution of electrical energy is the biggest company in Bosnia and Herzegovina with more than 4200 employees. The company management has decided in August 2021. to start with an implementation of new ITIL Service Desk Solution in order to solve increasing number of incidents, changes and problems, and generally to improve efficiency of its own Service Desk solution. The first measurements have been completed from September 2021. to January 2022. The implementation of the new ITIL Service Desk solution has been started in January 2022. and has been completed in May 2022. So, the second round of measurements started in April 2022. and have been completed in December 2022.

The concrete contribution of ITIL best practices is based on the implementation of Service Desk solutions on the example of the Public Company for the production and distribution of electrical energy in Bosnia and Herzegovina. The project started in September 2021 and lasted until October 2023. The project participants were IT Managers from the ICT sector of the public company as well as ITIL consultants from ATIA d.o.o. Sarajevo. The total budget for the realization of the project was EUR 197,000.

Specific ITIL practices taken from the Service Desk example included: IM (Incident Management), RF (Request Fulfillment), PM (Problem Management), CM (Change Management), SACM (Configuration Management). Implementation of ITIL practices took place in the following sectors of the public company: finance sector, law sector, human resources sector, electricity generation sector, electricity distribution sector, planning and development sector, ICT sector. The new implemented ITIL practices in the new implemented Service Desk solution have taken these information systems: SAP ERP (Enterprise Resource Planning), Oracle CRM (Customer Relationship Management), OWIS DMS (Document Management System) and Moodle LMS (Learning Management System).

These were main activities which should needed to be implemented in a new ITIL Service Desk solution:

- IM (incident management) – Incident management module. This module is used for user reporting of incidents and problems in working with ICT services. All domain users can submit a request through the user portal. The staff in charge of resolving requests through the administrative environment resolves requests based on the

ICT service to which the request is attached. This is one of the basic functionalities of the service desk application [1], [2], [3], [4], [5].

- RF (request fulfillment) – Module for managing user requests. All domain users can submit a request through the user portal. All domain users can submit a request through the user portal. The staff in charge of resolving requests resolves requests on the basis of the ICT service to which the request is attached. This is one of the basic functionalities of the service desk application [1], [2], [3], [4], [5].
- PM – Problem management – a module for problem management, a set of incidents that have the same cause of origin [1], [2], [3], [4], [5].
- CM – Change Management – change management module. Back in 2016, the ICT Sector, based on ITIL recommendations, established change management procedure no. Unfortunately, the implementation of this procedure is established in the existing tool, although it has this possibility, because the support of both the software manufacturer and the solution implementer has ceased [1], [2], [3], [4], [5].
- SACM – CMDB was created in the application, but filling and unification of individual records and CMDBs was not done. The company had a part of the database that is filled in, but CIs for services are not mapped. – This application module was implemented, but the database was not populated because it is necessary to manually enter and update each new equipment/software/license based on the contract by which it was acquired [1], [2], [3], [4], [5].

III. MEASUREMENTS BEFORE THE IMPLEMENTATION OF ITIL BEST PRACTICES

Below tables show Key Performance Indicators (KPIs) for practices: Incident management, Change management, Service desk and Problem management. All measurements are done from September 2021. to January 2022. and all measurements are completed before the implementation of ITIL best practices. For all practices are taken minimum five KPIs [4], [5]. Critical Success Factor values present real values which are taken for measurements inside a Company for production and distribution of electrical energy in a public sector of Bosnia and Herzegovina.

TABLE I. INCIDENT MANAGEMENT MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average time needed for the resolution of	36h	72%

incidents		
The number of incidents which are solved according to SLA during one month	8	68%
The percentage of incidents which are solved on the 1 st line of support without a need to be transferred on the 2 nd line of support	68%	77%
The percentage of resolved incidents which are found in Knowledge Database	74%	58%
The number of incidents which are solved by using VPN or some other remote access tool	8	82%

TABLE II. CHANGE MANAGEMENT MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average number of successfully solved emergency changes	10	69%
The average number of successfully solved standard changes	8	58%
The average time needed for the successfully resolution of all types of changes	7 days	62%
The reduction of total number of errors according to the implementation of all changes	8	82%
The average number of successful realized meetings of change advisory boards during one month	4	90%

TABLE III. SERVICE DESK MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average number of successfully realized events per one implemented IT service	6	75%
The average number of successfully realized events by using some IT tool	4	84%
The reduction of total number of events per one registered incident during one month	5	79%
The average increase number of SLAs inside the organization during one month	2	2%
The organization contains registered Knowledge Base for kinds of registered events	YES	NO

TABLE IV. PROBLEM MANAGEMENT MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average time needed for the resolution of problems	48 hours	64%
The number of problems which are solved according to SLA during one month	2	70%
The percentage of problems which are solved on the 1 st line of support without a need to be transferred on the 2 nd line of support	85%	72%
The percentage of resolved problems which are found in Knowledge Database	88%	63%
The number of problems which are solved by using VPN or some other remote access tool	3	79%

IV. MEASUREMENTS AFTER THE IMPLEMENTATION OF ITIL BEST PRACTICES

Incident management is the process of managing IT service disruptions and restoring services within agreed service level agreements (SLAs). The scope of incident management starts with an end user reporting an issue and ends with a service desk team member resolving that issue [4], [6], [7].

ITIL change management is a process designed to understand and minimize risks while making IT changes [4], [10], [11]. Businesses have two main expectations of the services provided by IT:

- The services should be stable, reliable, and predictable.
- The services should be able to change rapidly to meet evolving business requirements.

The purpose of the service desk practice is to capture demand for incident resolution and service requests. It should also be the entry point and single point of contact for the service provider with all of its users. It provides a clear path for users to report issues, queries, and requests, and have them acknowledged, classified, owned, and actioned [4], [12], [13].

Problem management is the process of identifying and managing the causes of incidents on an IT service. It is a core component of ITSM frameworks [14], [15], [16]. Figure 1. presents the activities of identification, logging, and categorization of all activities inside the implemented Service Desk solution. There are two types of incident escalation: functional and hierarchical.

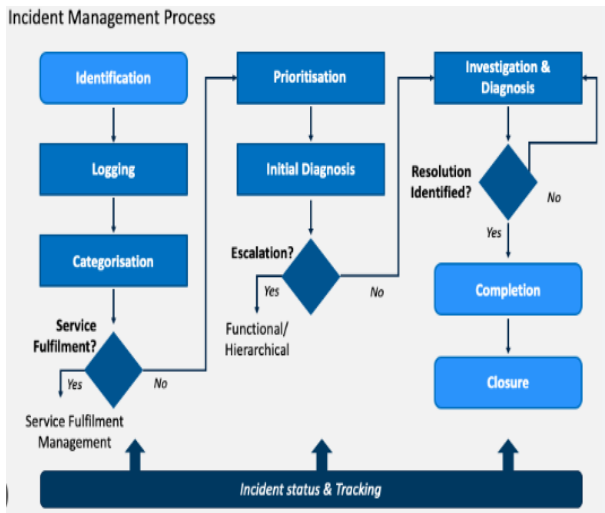


Figure 1. ITIL 4 Incident management practice with all key activities

Figure 2. presents the process of acceptance and rejection of changes including emergency changes, major changes, and standard changes. The Change Advisory Board (CAB) is responsible for decision making acceptance or rejection of all proposed changes.

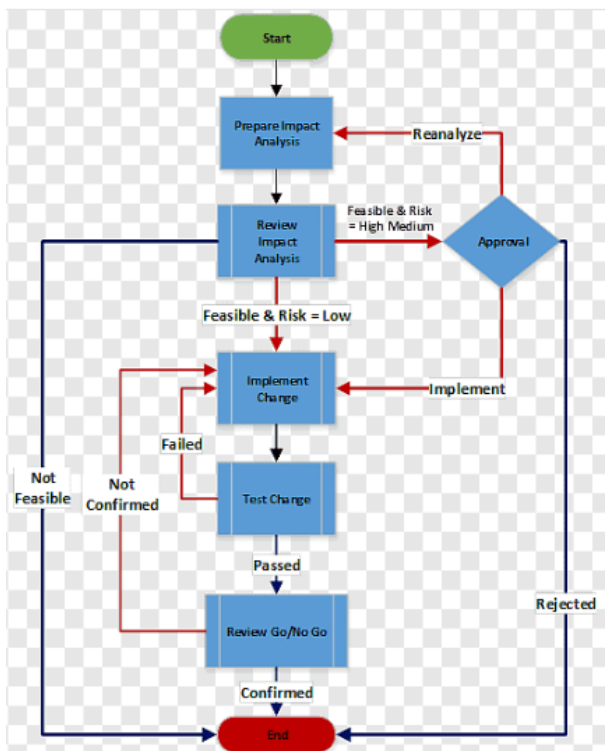


Figure 2. ITIL 4 Change management practice with all key activities

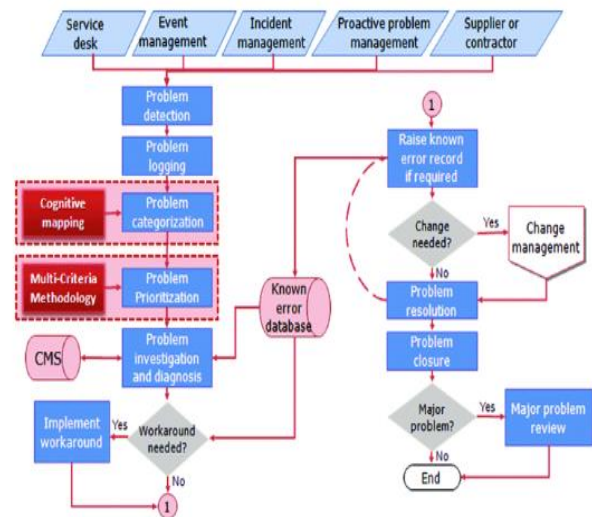


Figure 3. ITIL 4 Problem management practice with all key activities

Figure 3. presents key activities for the implementation of problem management process. The creation of a problem can happen from these five different sources: Service Desk, Event Management, Incident Management, Proactive Problem Management and Supplier.

Figure 4. presents six key activities for the maintenance of CMDB (Configuration Management Database) including: Strategy and Governance, SACM Policies, Process implementation, Change Risk and Financial Management, Reporting and Analysis and Data.



Figure 4. ITIL 4 Service Asset and Configuration Management practice with all key activities

Below tables show Key Performance Indicators (KPIs) for practices: Incident management, Change management, Service desk and Problem management [2], [3], [4], [5]. All measurements are done from April 2022. to December 2022. and all measurements are completed after the implementation of ITIL best practices. For all practices are taken minimum five KPIs and KPIs are the same as in section III.

TABLE V. INCIDENT MANAGEMENT MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average time needed for the resolution of incidents	26h	85%
The number of incidents which are solved according to SLA during one month	6	79%
The percentage of incidents which are solved on the 1 st line of support without a need to be transferred on the 2 nd line of support	77%	85%
The percentage of resolved incidents which are found in Knowledge Database	91%	81%
The number of incidents which are solved by using VPN or some other remote access tool	8	84%

TABLE VI. CHANGE MANAGEMENT MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average number of successfully solved emergency changes	12	78%
The average number of successfully solved standard changes	11	75%
The average time needed for the successfully resolution of all types of changes	5 days	81%
The reduction of total number of errors according to the implementation of all changes	8	85%
The average number of successful realized meetings of change advisory boards during one month	4	93%

TABLE VII. SERVICE DESK MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average number of successfully realized events per one implemented IT service	8	87%
The average number of successfully realized events by using some IT tool	5	89%
The reduction of total number of events per one registered incident during one month	4	91%
The average increase number of SLAs inside the organization during one month	3	9%
The organization contains registered Knowledge Base for kinds of registered events	YES	YES

TABLE VIII. PROBLEM MANAGEMENT MEASUREMENTS

KPI	Critical Success Factor value	Measurements for KPI
The average time needed for the resolution of problems	32 hours	82%
The number of problems which are solved according to SLA during one month	3	86%
The percentage of problems which are solved on the 1 st line of support without a need to be transferred on the 2 nd line of support	93%	85%
The percentage of resolved problems which are found in Knowledge Database	91%	82%
The number of problems which are solved by using VPN or some other remote access tool	5	91%

V. CONCLUSION

Below table shows comparison of results before the implementation of ITIL Service Desk solution and after the implementation of ITIL Service Desk solution in Company for production and distribution of electrical energy. Results in Table 9. are average results for all four ITIL practices included: Incident management, Change management, Service desk and Problem management.

TABLE IX. COMPARISON OF FINAL RESULTS

ITIL practice	The result before measurement	The result after measurement
Incident management	71.4%	82.8%
Change management	72.2%	82.4%
Service desk	48%	75.2%
Problem management	69.6%	85.2%

Results from table 9. show that the overall implementation of practices before the implementation of ITIL Service Desk was 65.3%, while the overall implementation of practices after the implementation of ITIL Service Desk was 81.4%. This means that the implementation of ITIL practices in Company for production and distribution of electrical energy was performed by 16.1% by the successful implementation of practices for Incident management, Change management, Service desk and Problem management.

Future work will be to extend the implemented ITIL Service Desk solution in the same Company by adding best practices for: Service catalogue management, Service level management, Release management, Availability management, IT asset management, Service configuration management and Business analysis.

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