Advantages of the implementation of Service Desk based on ITIL framework in telecommunication industry

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Abstract: - This paper describes the significance of the implementation of Service Desk based on ITIL framework. For the reference model is taken a Service Desk in Telecom operator which solves hundreds of users incidents, problems and requests during a one day. The aim of the paper is to compare the results of normal working a Service Desk before the implementation of ITIL and after the implementation of ITIL. The result of this comparison should show that a Service Desk with the implemented ITIL processes has achieved a better results than a Service Desk which doesn't contain processes from ITIL. For the implementation of ITIL Service Desk are chosen all processes which are dealing with users: Service Level Management, Supplier Management, Change Management, Event Management, Incident Management, Request Fulfillment and Problem Management. This paper gives a focus to the implementation of Service Desk solutions based on ITIL framework in any business environment in order to increase the business productivity.

Key-Words: - ITIL, Service Desk, Service Level Management, Supplier Management, Change Management, Event Management, Incident Management, Request Fulfillment, Problem Management.

1 Introduction

Service Desk plays an important role for the normal work of each organization. Today every organization must have some Service Desk solution which is responsible for solving users requests, incidents and problems. Service Desk software solutions take key activities for the implementation of its processes from various number of IT Service Management (ITSM) frameworks which include: CobiT, eTOM, ITIL, ISO/IEC 20000 etc. All these ITSM frameworks contain processes which are responsible for dealing and solving users requests, incidents and problems. By implementing all these solutions organizations get recommendations from these ITSM frameworks how to implement these strategic processes.

For this paper and the implementation of Service Desk is taken ITIL 2011 framework. ITIL is the most popular framework for the management of IT services. It contains five phases in which are placed 26 processes. For each process ITIL gives a set of key activities which are important for the implementation and a set of key performance indicators which are important for the measurement of processes. This paper is divided in two parts: the first one is just the measurement of key performance indicators in the old model of Service Desk. The second one is the description of the implementation of ITIL Service Desk by describing key activities for seven ITIL processes which are used for this model and by the measurement of the same key performance indicators as in the first part of the paper. For the implementation of this ITIL Service Desk model are taken seven processes which are also the part of any sophisticated ITSM solution: Service Level Management, Supplier Management, Change Management, Event Management, Incident Management, Request Fulfillment, Problem Management.

This paper is divided in six chapters. The second chapter describes a test environment and a methodology used for this research. The third chapter shows results of the measurement of the old model of Service Desk solution. The fourth chapter shows the implementation of a ITIL Service Desk model by describing the realisation of key activities for seven ITIL processes. The fifth chapter shows results of the measurement of the new model of Service Desk solution. The sixth chapter of the

paper is the conclusion of the paper which shows the advantage of the new model of Service Desk which is based on ITIL 2011 framework.

2 Reference model and research methodology

For the reference model is taken Service Desk in one Telecom operator in Bosnia and Herzegovina. Telecom operator contains all main services which include: fixed telephony, mobile telephony, IPTV, VoIP, Internet, Hosting and E-mail. Before the implementation of this project, Telecom operator has the old software Service Desk solution which was not compatible with any of IT Service Management frameworks and standards. The process of solving users incidents and problems was too slow especially on services connected to the IP network: IPTV, VoIP, Internet, Hosting and E-mail. Some everyday users requests and problems which appear on Service Desk are: termination of telephone device, the loss of TV picture, stop working of internet on cell phones, stop working of cell phones, changing password for internet, changing PIN for IPTV, excessive bills for services, inability to purchase video content on Video on Demand service, inability to record content on TV channels, the request for the replacement of terminal equipment, creating of new e-mail addresses, creating a new domain on hosting service, loss of codes for mobile phones, long time for solving problems between departments within Telecom operators etc. Figure 1. shows Service Desk and departments inside a Telecom operator which all have installed a Service Desk application.

The methodology of this paper contains two basic steps. The first step are measurements of the implemented Service Desk by using a predefined set of key performance indicators. The second step is the implementation of Service Desk by using ITIL recommendations for seven processes and finally making measurements for all seven ITIL processes. For the measurement of results is taken a technique called Gap Analysis.

Gap analysis is a business assessment tool enabling an organization to compare where it is currently and where it wants to go in the future. This provides the organization with insight to areas that have room for improvement. The process involves determining, documenting and approving the variance between business requirements and current capabilities. Gap analysis naturally flows from benchmarking or other assessments such as service or process maturity assessments. This comparison becomes the gap analysis, which can be performed at the strategic, tactical or operational level of an organization. Gap analysis provides a foundation for how much effort in time, money and human resources is required to achieve a particular goal.

3 Measurement results on Service Desk before the implementation of ITIL processes

Table I. shows the result of the implementation for each key performance indicator for Service Level Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators. The final result of the successful implemented key performance indicators for this process is 74%.

Table II. shows the result of the implementation for each key performance indicator for Supplier Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators. The final result of the successful implemented key performance indicators for this process is 69.60%.

Table III. shows the result of the implementation for each key performance indicator for Change Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators. The final result of the successful implemented key performance indicators for this process is 71.80%.

Table IV. shows the result of the implementation for each key performance indicator for Event Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators. The final result of the successful implemented key performance indicators for this process is 77%.

Table V. shows the result of the implementation for each key performance indicator for Incident Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators. The final result of the successful implemented key performance indicators for this process is 78.40%.

Table VI. shows the result of the implementation for each key performance indicator for Request Fulfillment process, the value of critical success factor and the percentage of the successful implemented key performance indicators. The final result of the successful implemented key performance indicators for this process is 81%.

Table VII. shows the result of the implementation for each key performance indicator for Problem Management process, the value of critical success factor and the percentage of the

successful implemented key performance indicators. The final result of the successful implemented key performance indicators for this process is 77.80%.

Table VIII. shows a brief summary of results of the implementation for each ITIL process before the implementation of ITIL Service Desk solution. The final result of the successful implemented key performance indicators for all ITIL processes before the implementation of these processes is 75.65%.

4 Implementation of Service Desk based on ITIL framework

Service Desk based on ITIL has been developed on University on Sarajevo (Faculty of Electrical Engineering) in laboratory for IT Service Management. This Service Desk contains seven processes which are all connected with suppliers, clients and internal processes. This developed Service Desk is user friendly and adaptive for learning to all employees in company. ITIL processes which are integrated in this solution are: Service Level Management, Supplier Management, Change Management, Event Management, Incident Management, Request Fulfillment and Problem Management. For all these processes will be shown key activities which are used for the implementation of this software solution. Figure 2. shows user interface of the developed Service Desk solution.

Key activities with Service Level Management process should include:

- Determining, negotiating and documenting requirements for new and changed services in SLA contracts, and managing and reviewing them through the service lifecycle
- Monitoring and measuring service performance achievements of all operational services against targets in SLAs
- Producing service reports
- Conducting service reviews, identifying improvement opportunities for inclusion
- Collating, measuring and improving customer satisfaction in cooperation with business relationship management
- Reviewing and revising SLAs and OLAs
- Developing and documenting contacts and relationships with the business, customers and stakeholders in cooperation with business relationship management process
- Logging and managing complaints and compliments in cooperation with business relationship management.

Key activities for Supplier Management process should include:

- Definition of new supplier and contract requirements: identify business need and prepare of the business case
- Evaluation of new supplier and contracts: identify method of purchase and procurement, establish evaluation criteria and negotiate contracts and targets
- Categorization of suppliers and contracts: assess and reassess the supplier and contract, ensure changes progressed and categorization of suppliers
- Establishment of new suppliers and contracts: setting the supplier service and contract, transitioning the service and establishing contacts and relationships
- Supplier, contract and performance management: manage and control the operation and delivery of service, monitor and report and manage the supplier and the relationship.

Key activities for Change Management process include:

- Planning and controlling changes
- Change and release scheduling
- Communications
- Making change decisions and authorization of change
- Ensuring that remediation plans are in place
- Measurement and control
- Management reporting
- Understanding the impact of the change
- Continual improvement.

Key activities for Event Management process include:

- Event occurs – Everybody involved in designing, developing, managing and supporting IT services understand what type of event need to be detected
- Event notification – A general principle of event notification is that the more meaningful data it contains and the more targeted the audience, the easier is to make decisions about the event.
- Event detection – Once and event notification has been generated, it will be detected by an agent running on the same system, or transmitted directly to a

management tool specifically designed to read and interpret the meaning of the event.

- Event logged – The event can be logged as an event record in the event management tool.
- First level event correlation and filtering – The purpose is to decide whether to communicate the event to a management tool or to ignore it. In that case the event will be usually recorded in a log file on the device and no further action will be taken.
- Significance of events – Every organization will have its own organization of the significance of an event but it is suggested that at least these three broad categories be represented.
- Second level event correlation – If it is a warning event, a decision has to be made about exactly what the significance is and what actions need to be taken to deal with it. A correlation engine is programmed according to the performance standards created during service design.
- Further action needed – If the second level correlation activity recognizes the event, a response will be required. There are many different types of responses, each designed specifically for the task it has to initiate.
- Response selection – At this type of the process, there are a number of respons options available. Response options can be taken in any combination. There are lot of options like: auto response, alert and human intervention, incident, problem, or change, open an request for change, open an incident record and open or a link to a problem record.
- Review actions – It is important to check that any significant events or exceptions have been handled and to track trends or event types. In many cases it can be done automatically. In cases where events have initiated an incident, problem or change, the action review should not duplicate any reviews that have been done as part of those processes.
- Close event – Some events will remain open until a certain action takes place, for example an event that is linked to an open incident. It is sometimes very difficult to relate open and closed events if there are in different formats.

Key activities for Incident Management process include:

- Incident identification – All key components should be monitored so that failures are detected early. This means that this process can be started quickly.
- Incident logging – All incidents must be fully logged regardless it is raised through a telephone call, automatically detected or from other source.
- Incident categorization – It is needed to allocate suitable incident categorization so that the exact type of incident is recorded. This is very important because of incident types.
- Incident prioritization – Prioritization can be normally determined by taking into account the urgency of the incident and the level of business impact it is causing. An indication of impact is very often the number of users affected.
- Initial diagnosis – If the incident has been routed via the service desk, the service desk analyst must carry out initial diagnosis, typically while the user is on telephone and to try to discover the full symptoms of the incident and to determine exactly what has gone wrong and how to correct it.
- Incident escalation – If the staff of Service Desk is unable to resolve the incident, it must be immediately escalated for further support. Some incidents may require multiple support groups to resolve. Support groups may be internal and they may be third parties like software suppliers or hardware manufactures.
- Investigation and diagnosis – All support groups involved with the incident handling will investigate and diagnose potential problems and make the fully documentation about it. The valuable time can often be lost if investigation or diagnostic action is performed serially. Such actions should be performed in parallel to reduce overall timescales.
- Resolution and recovery – Any potential resolution should be applied and tested. The specific actions need to be undertaken. Even when some resolution of incident is found, sufficient testing must be performed to ensure that recovery action is complete and that normal state service has been restored.
- Incident closiure – The service desk should check that the incident is fully resolved and

that users are satisfied and agree that some incident can be closed.

- Rules for reopening incidents – There will be occassions when incidents recur even though they have been formally closed. Because of such cases, it is wise to have predefined rules about if and when an incident can be reopened. It is very disarable situation when some incidents are solved in one working day after re-opening of them. The exact time may vary between individual organizations but clear rules should be agreed and documented and guidance given to all service desk staff so that uniformity is applied.

Key activities for Request Fulfillment process include:

- Receiving a request – Fulfilment work on service requests should not begin until a formalized request has been received. Service requests should mostly come from the Service Desk.
- Request logging and validation – All service requests should be fully logged and timely stamped, regardless is service request from service desk, telephone call or e-mail.
- Request categorization – Part of the initial logging it is needed to allocate request categorization so that the exact type of the request is recorded.
- Request prioritization – Another very important step is to allocate an appropriate prioritization code, and to determine how the service request is handled by the Service Desk staff.
- Request authorization – All service requests need to be properly authorized. Simple authorizations can take place via Service Desk. Service requests that can not be properly authorized should be returned to the requestor with the reason for the rejection.
- Request review – The request is reviewed to determine the function that will fulfil it. As requests are reviewed, the request records should be updated to reflect the current request status.
- Request model execution – A request model should be used that documents a standard process flow, roles and responsibilities to fulfill it. The appropriate request model should be chosen based on the type of service request. All service requests in the

real environment should also be authorized through Change Management process.

- Request closure – When service request activities have been completed, the service desk should be notified of the completion status. The Service Desk should check that the request has been fulfilled and that users are satisfied and agree to close the service request.

Key activities for Problem Management process include:

- Problem detection – There are multiple ways of detecting problems that will exist in all organizations. These can include triggers for reactive and proactive problem management.
- Problem logging – All the relevant details of the problem must be recorded so that a full historic record exists. This must be date and time stamped to allow suitable control and escalation.
- Problem categorization – Problems should be categorized in the same way as incidents so that the nature of the problem can be easily traced in the future and meaningful management information can be obtained.
- Problem prioritization – Problems should be prioritized in the same way as incidents. The frequency and the impact of related incidents should be also taken into account. For the problem prioritization it is very important the severity of the problems. Severity explains how serious is the problem from a service or customer perspective.
- Problem investigation and diagnosis – An investigation should be conducted to try to diagnose the root cause of the problem. The speed and the nature of the investigation will depend on the impact, severity and urgency of the problem. There are a lot of useful techniques that can be used to diagnose and resolve problems.
- Raising a known error record – This is defined as a problem with a documented root cause and workaround. The known error record should identify the problem and a status of document which status is important for resolving the problem. In some cases it may be advantageous to raise a known error record even earlier in some processes, even though a diagnosis it may not be complete. This might be used for

information purposes or to identify some workaround that appears to address the problem that has not been fully completed.

- Problem resolution – When a root cause has been found and a solution to remove it has been developed, it should be applied to resolve the problem. If the problem is very serious and some urgent fix is needed because of business reasons, than an emergency request for change should be raised.
- Problem closure – When a final resolution has been applied, the problem record should be formally closed. A check should be performed at this time to ensure that a record contains a full historical description of all events.
- Major problem review – After every major problem, a review should be conducted to learn any lessons for the future. Such reviews can be used as part of the training and awareness activities for support staff.

5 Measurement results on Service Desk after the implementation of ITIL processes

Table IX. shows the result of the implementation for each key performance indicator for Service Level Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators after the implementation of ITIL Service Desk. The final result of the successful implemented key performance indicators for this process is 88.80%.

Table X. shows the result of the implementation for each key performance indicator for Supplier Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators after the implementation of ITIL Service Desk. The final result of the successful implemented key performance indicators for this process is 86.80%.

Table XI. shows the result of the implementation for each key performance indicator for Change Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators after the implementation of ITIL Service Desk. The final result of the successful implemented key performance indicators for this process is 82%.

Table XII. shows the result of the implementation for each key performance indicator for Event Management process, the value of critical success factor and the percentage of the successful

implemented key performance indicators after the implementation of ITIL Service Desk. The final result of the successful implemented key performance indicators for this process is 85.20%.

Table XIII. shows the result of the implementation for each key performance indicator for Incident Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators after the implementation of ITIL Service Desk. The final result of the successful implemented key performance indicators for this process is 90.20%.

Table XIV. shows the result of the implementation for each key performance indicator for Request Fulfillment process, the value of critical success factor and the percentage of the successful implemented key performance indicators after the implementation of ITIL Service Desk. The final result of the successful implemented key performance indicators for this process is 87.60%.

Table XV. shows the result of the implementation for each key performance indicator for Problem Management process, the value of critical success factor and the percentage of the successful implemented key performance indicators after the implementation of ITIL Service Desk. The final result of the successful implemented key performance indicators for this process is 88.80%.

Table XVI. shows a brief summary of results of the implementation for each ITIL process after the implementation of ITIL Service Desk solution. The final result of the successful implemented key performance indicators for all ITIL processes after the implementation of these processes is 87.05%.

6 Conclusion

Service Desk based on ITIL has achieved better results of the implementation than the first model of Service Desk. This new model has achieved a better result for 11.40% than the previous model of Service Desk. All seven processes from the Service Desk based on ITIL have achieved better results of the implementation: Service Level Management (14.80%), Supplier Management (17.20%), Change Management (10.20%), Event Management (8.20%), Incident Management (11.80%), Request Fulfillment (6.60%) and Problem Management (11%).

Service Desk based on ITIL has performed all processes in Telecom operator which are connected to end users. This means that this Service Desk even improves internal business processes inside the organization and automatize some internal processes. What's the most important is that a new Service Desk can be implemented in any business

organization and that this Service Desk contains even seven processes responsible for solving user's requests, incidents and problems.

Future research is connected to the improvement of the implemented Service Desk solution based on ITIL. The aim is to improve it by adding some new processes from ITIL which will include Service Catalogue Management and Access Management. Service Catalogue Management should be responsible for providing and maintaining a single source of consistent information of all operational services. Access Management will be responsible for providing the right for users to be able to use one service or group of services.

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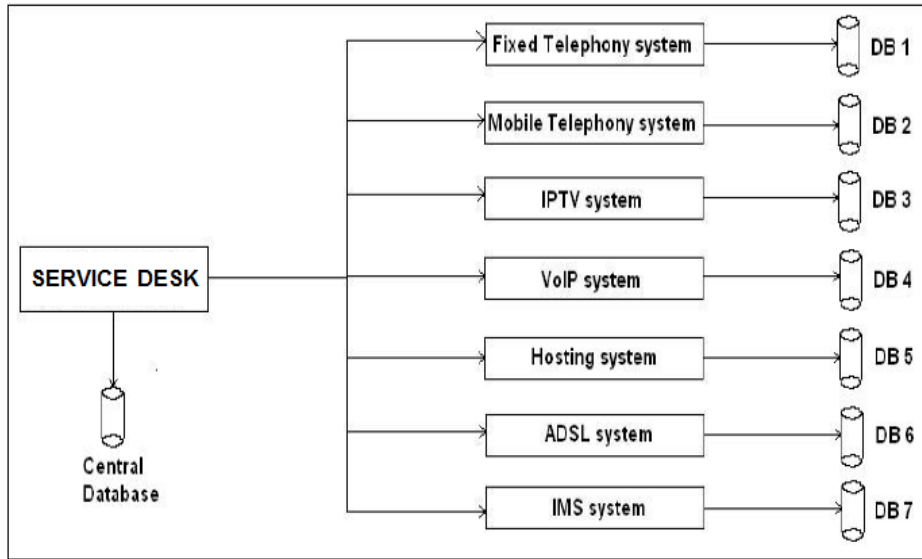
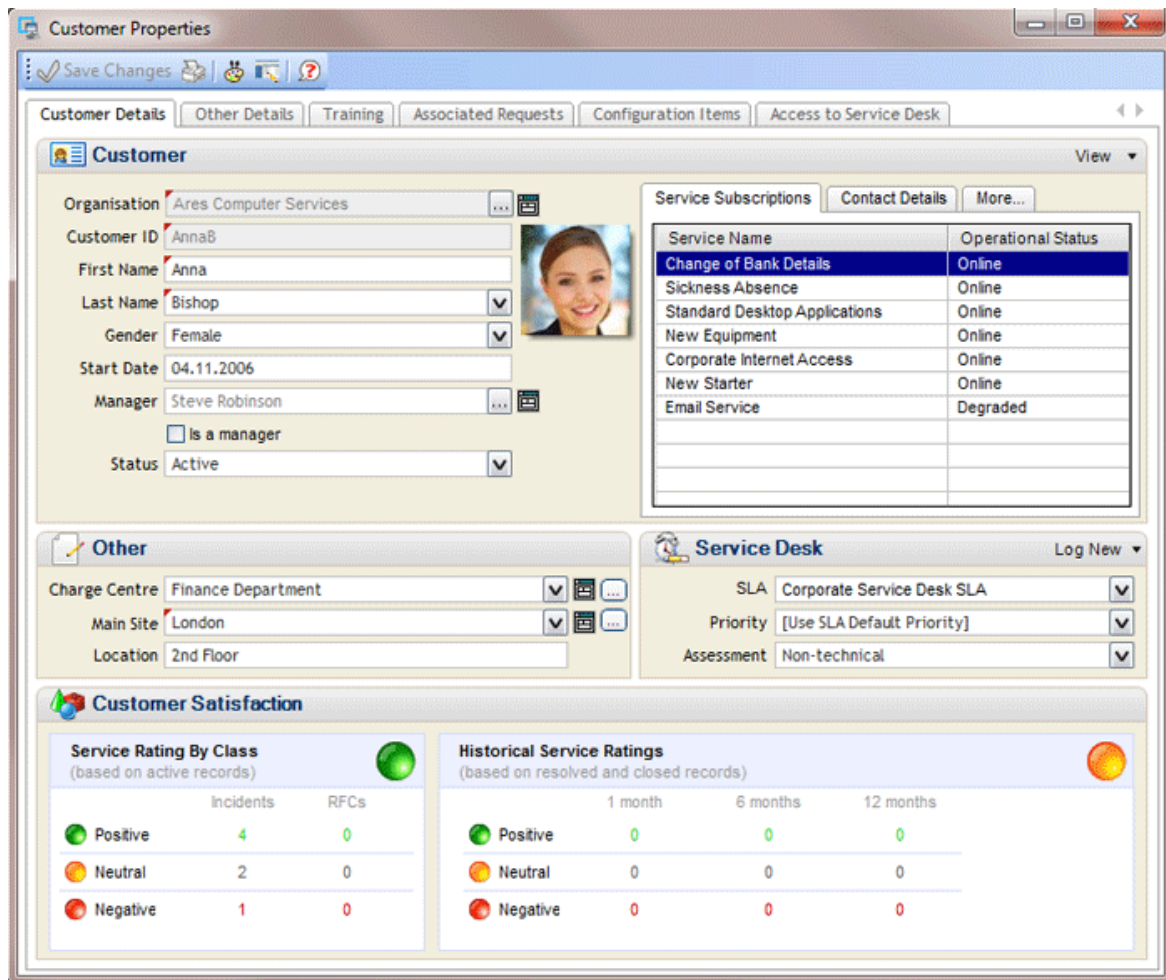Figure 1. Service Desk and departments inside a Telecom operator

Figure 2. User interface for the developed Service Desk solution

TABLE I. MEASUREMENTS FOR SERVICE LEVEL MANAGEMENT PROCESS

Key performance indicator for Service Level Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of services which are covered under SLA	82%	100%	82%
The percentage of users with SLAs contract which submitted a complaint	12%	10%	80%
The percentage of suppliers with contract which submitted a complaint	25%	20%	75%
The maximum allowed time for defining SLA, OLA or contract	22 days	15 days	53%
The maximum allowed reduction in time taken to respond to and implement SLA requests	6 days	5 days	80%

TABLE II. MEASUREMENTS FOR SUPPLIER MANAGEMENT PROCESS

Key performance indicator for Supplier Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The number of suppliers meeting the targets within the contract	8	10	80%
The number of service and contractual reviews held with suppliers	12	16	75%
The number of service breaches caused by suppliers	6	4	50%
The number of suppliers with nominated supplier managers	5	8	63%
The number of contracts with nominated contract managers	12	15	80%

TABLE III. MEASUREMENTS FOR CHANGE MANAGEMENT PROCESS

Key performance indicator for Change Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of changes that meet the customer's agreed requirements	85%	95%	89%
The percentage of reduction in the number of incidents attributed to	20%	30%	67%

changes			
The percentage of reduction in the number of unauthorized changes identified	15%	25%	60%
The percentage of reduction in the number of changes with incomplete change specifications	18%	25%	72%
The percentage of reduction in the number of changes with incomplete impact assessments	12%	17%	71%

TABLE IV. MEASUREMENTS FOR EVENT MANAGEMENT PROCESS

Key performance indicator for Event Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The number of incidents that occurred and which are triggered without a corresponding event	18	26	69%
The percentage of events compared with the number of incidents	60%	75%	80%
The percentage of events caused by existing problems or known errors	70%	85%	82%
The percentage of events that resulted in incidents or changes	65%	90%	72%
The percentage of events indicating performanse issues	72%	88%	82%

TABLE V. MEASUREMENTS FOR INCIDENT MANAGEMENT PROCESS

Key performance indicator for Incident Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of incidents closed by the service desk without reference to other levels of support	65%	82%	79%
The percentage of incidents solved remotely without the need for a visit	43%	55%	78%
The maximum allowed time for solving every type of incident	30 hours	24 hours	75%
The average number of service desk calls during one day	147	120	78%

The percentage of incidents handled within agreed response time	82%	100%	82%

TABLE VI. MEASUREMENTS FOR REQUEST FULFILLMENT PROCESS

Key performance indicator for Request Fulfillment process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of service requests which are completed in agreed target times	72%	85%	85%
The percentage of service requests closed by the service desk without reference to other levels of support	74%	92%	80%
The percentage of service requests solved remotely without the need for a visit	41%	60%	68%
The percentage of the total number of calls on Service Desk connected to service requests	32%	30%	93%
The percentage of problems handled within agreed response time	79%	100%	79%

TABLE VII. MEASUREMENTS FOR PROBLEM MANAGEMENT PROCESS

Key performance indicator for Problem Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of problems closed by the service desk without reference to other levels of support	75%	85%	88%
The percentage of problems solved remotely without the need for a visit	42%	55%	76%
The maximum allowed time for solving every type of problem	7 days	10 days	70%
The average number of service desk calls during one day	12	10	80%
The percentage of problems handled within agreed response time	75%	100%	75%

TABLE VIII. THE RESULTS OF THE IMPLEMENTATION OF ITIL PROCESSES BEFORE THE IMPLEMENTATION OF ITIL SERVICE DESK

ITIL process name	The result of implementation for each ITIL process
Service Level Management	74.00%
Supplier Management	69.60%
Change Management	71.80%
Event Management	77.00%
Incident Management	78.40%
Request Fulfillment	81.00%
Problem Management	77.80%

TABLE IX. MEASUREMENTS FOR SERVICE LEVEL MANAGEMENT PROCESS AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

Key performance indicator for Service Level Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of services which are covered under SLA	94%	100%	94%
The percentage of users with SLAs contract which submitted a complaint	10%	10%	100%
The percentage of suppliers with contract which submitted a complaint	22%	20%	90%
The maximum allowed time for defining SLA, OLA or contract	18 days	15 days	80%
The maximum allowed reduction in time taken to respond to and implement SLA requests	6 days	5 days	80%

TABLE X. MEASUREMENTS FOR SUPPLIER MANAGEMENT PROCESS AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

Key performance indicator for Supplier Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The number of suppliers meeting the targets within the contract	9	10	90%
The number of service and contractual reviews held with suppliers	14	16	88%
The number of service breaches caused by suppliers	5	4	75%
The number of suppliers with nominated supplier managers	7	8	88%
The number of contracts with nominated contract managers	14	15	93%

TABLE XI. MEASUREMENTS FOR CHANGE MANAGEMENT PROCESS AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

Key performance indicator for Change Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of changes that meet the customer's agreed requirements	88%	95%	93%
The percentage of reduction in the number of incidents attributed to changes	23%	30%	77%
The percentage of reduction in the number of unauthorized changes identified	17%	25%	68%
The percentage of reduction in the number of changes with incomplete change specifications	21%	25%	84%
The percentage of reduction in the number of changes with incomplete impact assessments	15%	17%	88%

TABLE XII. MEASUREMENTS FOR EVENT MANAGEMENT PROCESS AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

Key performance indicator for Event Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The number of incidents that occurred and which are triggered without a corresponding event	24	26	92%
The percentage of events compared with the number of incidents	63%	75%	84%
The percentage of events caused by existing problems or known errors	68%	85%	80%
The percentage of events that resulted in incidents or changes	74%	90%	82%
The percentage of events indicating performanse issues	77%	88%	88%

TABLE XIII. MEASUREMENTS FOR INCIDENT MANAGEMENT PROCESS AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

Key performance indicator for Incident Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of incidents closed by the service desk without reference to other levels of support	69%	82%	84%
The percentage of incidents solved remotely without the need for a visit	46%	55%	84%
The maximum allowed time for solving every type of incident	27 hours	24 hours	88%
The average number of service desk calls during one day	108	120	100%
The percentage of incidents handled within agreed response time	95%	100%	95%

TABLE XIV. MEASUREMENTS FOR REQUEST FULFILLMENT PROCESS AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

Key performance indicator for Request Fulfillment process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of service requests which are completed in agreed target times	79%	85%	93%
The percentage of service requests closed by the service desk without reference to other levels of support	81%	92%	88%
The percentage of service requests solved remotely without the need for a visit	47%	60%	78%
The percentage of the total number of calls on Service Desk connected to service requests	32%	30%	93%
The percentage of problems handled within agreed response time	86%	100%	86%

TABLE XV. MEASUREMENTS FOR PROBLEM MANAGEMENT PROCESS AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

Key performance indicator for Problem Management process	The measured value of key performance indicator	The value of critical success factor	The percentage of the successful implemented key performance indicators
The percentage of problems closed by the service desk without reference to other levels of support	80%	85%	94%
The percentage of problems solved remotely without the need for a visit	48%	55%	87%
The maximum allowed time for solving every type of problem	9 days	10 days	90%
The average number of service desk calls during one day	11	10	90%
The percentage of problems handled within agreed response time	83%	100%	83%

TABLE XVI. THE RESULTS OF THE IMPLEMENTATION OF ITIL PROCESSES AFTER THE IMPLEMENTATION OF ITIL SERVICE DESK

ITIL process name	The result of implementation for each ITIL process
Service Level Management	88.80%
Supplier Management	86.80%
Change Management	82.00%
Event Management	85.20%
Incident Management	90.20%
Request Fulfillment	87.60%
Problem Management	88.80%