Business-oriented Development Methodology for IT Service Management

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Abstract

Service management is now probably the most potent approach to the management of information technology from a business perspective. Service management helps focus on business services in spite of the heterogeneity in the underlying IT infrastructure. Consequently, many large organizations are implementing standard IT Service Management guidelines, such as the ITIL. However, there is a need for an integrated methodology (independent of the business sector and underlying technologies) that would allow the development of service solutions from a business perspective. This paper presents a business-oriented 8-Stage Service Design and Management methodology that integrates Total Quality Management techniques, such as House of Quality (HoQ) Matrices to help quantify qualitative service management parameters. The methodology is illustrated with a case study of a major utility organization in Australia, an early adopter of a structured IT Service Management methodology.

1. Introduction

In most of the developed countries, services account for a dominant percentage of economic activities; there are many types' services now being offered by service providers, travel, retails and financial services [1]. The operations of these services are now heavily dependent on information technologies thanks to the growth of e-businesses in a number of industries including telecommunication and healthcare [10], [11], [12]. As a matter of fact, the study of services is emerging as a new academic discipline [13], [14], [16]. IT functions are now being modeled, implemented and managed as services thanks to the growth in many management frameworks and platforms [17], 18]. However, there is still a disconnection between the business planning of services and the management of underlying IT services; many organizations try to solve this disjoint by leveraging the Service-Oriented Architecture (SOA) techniques to manage the complete lifecycle of service creation, deployment and operations [7]. Although SLAs are commonly used to define and manage services, there is no standard methodology to define them. Hence there is a need for a methodology for ITSM from the perspective of service business that can exist in any sector, such as retail, travel, airline, restaurant etc.

IT Service Management (ITSM) is also about efficiently and effectively using of people, processes, products and partners [4]. ITSM helps organizations in keeping pace with business needs and providing guaranteed levels of service at predetermined costs [2]. A 2002 Hacket study showed that well-aligned ITSM could save an average of 17 percent per user while providing up to 28 percent improvement in project completion rates [3]. Since many service parameters are qualitative, it is important to quantify them in order to develop a computational solution to the service management problem.

This paper presents an 8-stage methodology for the business-oriented development and management of IT services and its illustration through a case study in a large utility organization. The paper is organized as follows. The next section discusses the research motivation and contribution. Section 3 presents an Integrated ITSM Methodology based on the 8 stage model [8]. This is followed by an ITSM case study of a large Australian utility company in section 4. Section 5 provides a discussion of lessons learned by applying this methodology. At last, in section 6, we conclude with a brief discussion of future work.

2. Motivation and Contribution

Viewing from the perspective of the development of service management solutions based on SOA, we need service management requirements to be specified in quantitative objectives. There is a need for methodologies that would help translate qualitative service requirements of a business to accurate computational solutions based on SOA [9], [11].

Current software engineering methodologies (e.g., iterative, agile) aim at reducing errors in capturing user requirements. But they do not provide any means of quantifying the qualitative business parameters. On the other hand, new ITSM frameworks are focusing on operational-side of service management. For example, the IT

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Information Library (ITIL) introduces 10 disciplines in Service Delivery (Deployment Management) and Service Support (Operation Management); unfortunately, it leaves the Service Definition and Development out of the picture. Several widely-accepted vendor-specific ITSM frameworks, such Microsoft Operating Framework (MOF), HP ITSM Reference Model, and IBM Systems Management Solution Lifecycle (SMSL), extend the ITIL framework, and they are much more operational and infrastructural than ITIL [6]. Control Objectives for Information and Related Technology (CobiT) creates the link between the business objectives and IT management tasks. It does cover the full service life cycle, however, CobiT is not a complete ITSM methodology; there is no accompanying process model in this framework. Furthermore, ITSM processes do not map exactly onto CobiT control objectives [5].

Hence, there is a demand for a methodology covering the whole lifecycle of service business management, from inception until retirement. The integrated business-oriented methodology presented in this paper fills in this gap by closing the loop of Service Design and Service Management (the service lifecycle). A well-known technique from Total Quality Management (TQM) called House of Quality (HoQ) has been used to quantify the service parameters that are qualitative in nature. This methodology has been illustrated in this paper with a case study in a major Utility organization.

3. Integrated ITSM Methodology

The 8-Stage Service Design and Management Model (8-Stage Model) was introduced by Rohit Ramaswamy [8]. This integrated model has evolved from AT&T's service development, and is based on quality management principles. It is a useful tool in the formulation and management of qualitative service through top-down quantification [9]. As illustrated in Figure 1, an IT service goes through 8 stages in its life cycle. These 8 stages can be further grouped into two phases: *Service Design* and *Service Management*. Therefore, this 8-Stage Model provides a way of integrating design and management functions of any IT service [9].

In this paper, we present the Integrated Business-oriented ITSM Methodology based on the 8-Stage Model, integrated with ITIL best practices. We validate the 8-stage methodology by its application in one of the largest water utility corporations in Australia.

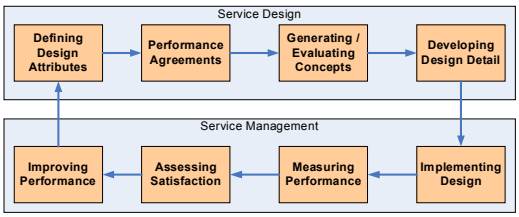

Figure 1. 8-Stage Model [8], [9]

4. Case Study

4.1 WUC – The ITSM Early Adopter

This water utility corporation (Let's call it WUC, actual name suppressed) is a wholly state government owned utility company. It provides services to more than four million people; it is responsible for managing reservoirs and water distribution networks; and it is also the approving authority for water distribution system in the housing industry. It has more than 3000 employees, and it inherited a strong engineering culture. The ultimate goal of WUC is to provide satisfactory services to its stakeholders. Various service levels have been established for WUC to achieve its goal, for example, it is required to fix most water distribution pipe leakage within 24 hours; it is required to provide water system design for new building within one months of submission; it is required to test water quality daily; etc.

To enable these business functions, a number of IT systems have been implemented. For instance, call center applications assist customer care representatives in managing customer enquiries, reporting, and complaints. Assets monitoring system help engineers to constantly monitor reservoirs and water distribution networks. Field Resource Management (FRM) systems assign maintenance work to field crew.

As one of its internal business units, IT division (WUC IT) delivers, manages and supports these information systems for WUC business divisions. In the past few years, WUC IT has been moving towards a Service-Oriented business model, and manages these systems via Service Level Agreements (SLAs). However, different systems require different service levels, needing different types of service management. For instance, the asset monitoring system must be supported for 24*7, dedicated application clusters are deployed; On the other hand, the finance and HR systems are allowed for 3 days turn-around time in disaster situations.

To standardize ITSM process, WUC IT has established a sophisticated IT service delivery and operation management framework, called Project Delivery Framework (PDF). PDF follows

iterative principles, and emphases continuous interaction between WUC IT and businesses at both day-to-day Operation Management level and strategic Project Delivery level. This iterative ITSM framework has 4 phases as illustrated in Figure 2.

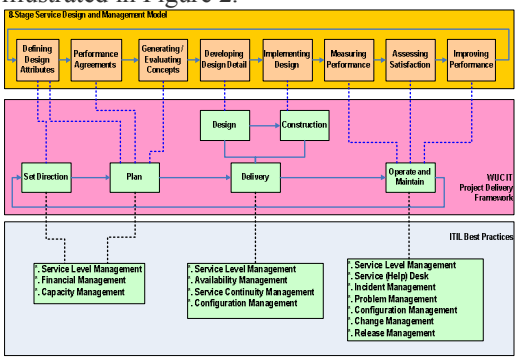

Figure 2. WUC PDF and 8-Stage Mapping

The purpose of the *Set Direction* phase is to assess IT service initiatives for their feasibility, mainly based on financial justification, i.e. return on investment (ROI). The *Plan* phase will further evaluate implementation options, and define service delivery strategies. Tasks defined in these two phases can be closely mapped onto the first 3 stages of the 8-Stage Model. ITIL principles, i.e. Service Level Management, Financial Management, and Capacity Management have also been introduced. The *Delivery* phase of the PDF consists of two sub-phases, Design and Construction; they can be mapped onto the 4th and 5th stages of the 8-Stage Model respectively. ITIL guidelines, such as Service Level Management, Availability Management, Service Continuity Management, and Configuration Management are also leveraged. The *Operate and Maintain* phases deal with the day-to-day service operation management; it can be mapped to the last 3 stages of the 8-Stage Model. All ITIL Service Management best practices have been utilized. Table 1 below provides lists some of the WUC tasks and artifacts in each PDF phase against the 8 stages.

4.2 The Application of 8-Stage ITSM

As mentioned earlier, the Integrated ITSM Methodology presented here will extend the 8-Stage Model to integrate ITIL best practices for effective service delivery and management. As illustrated in Figure 3, ITSM uses Service Level Management (SLM) for providing quality IT services that meet SLA. Hence, SLA should provide the glue between management requirements, and the underlying IT services. The 8-stage methodology is described next.

In the *Defining Design Attributes* stage, the focus of SLM is to identify customer needs and quantify performance attributes. All these attributes must be measurable, and must be assessed against enabling technologies; they also have to meet business requirements. In the *Performance Agreement* stage, the focus of SLM is to refine those attributes, document them in business understanding terms, and seek agreement with customer. In the *Generating / Evaluating Concepts* stage, the focus of SLM is to generate and evaluate potential solution options from an IT service perspective and basing on their ability to honor SLA. In the *Developing Detail Design* stage, the focus of SLM is to ensure the designed solution can honor SLAs, i.e. capability, availability, and response time. In the *Implementing Design* stage, the focus of SLM is to implement the solution to meet SLAs; this may include performance heartbeats and monitoring dashboard development. In the *Measuring Performance* stage, the focus of SLM is to honor SLA through constantly monitoring the network, system and applications, as well as external providers' SLAs. In the *Assessing Satisfaction* stage, the focus of SLM is to periodically get feedback from users, assess their satisfaction level, and understand their increasing expectations due to business improvement and technology advancement. In the *Improving Performance* stage, the focus of SLM is to ensure SLA being constantly reviewed to reflect user expectations; this can be achieved through operational enhancement, system upgrading, and new IT service implementation.

4.3 The 8 Stages

4.3.1 Stage 1 - Defining Design Attributes

The goal of this stage is to identify customer service needs, prioritize these needs, specify design attributes to meet these needs; create quantitative measures for each attribute; and establish cost benefits relationship through quantification matrices. Service Level Management, ITIL Financial Management best practices should be performed in this stage; IT service benefits, should be assessed to ensure the service delivery and management cost is justifiable. HoQ matrices can be employed to systematically quantify service quality attributes.

Stage/Activity	Set Direction	Plan	Delivery	Operate and Maintain
Stage 1 Defining Design Attributes	Pattern Match	Business Requirement		
Stage 2 Performance Standards / Agreements		SLAs Negotiation and Agreement		
Stage 3 Generating / Evaluating Concepts		Solution Option Evaluation		
Stage 4 Developing Design Detail			System Design	
Stage 5 Implementing Design			System Implementation	
Stage 6 Measuring Performance				Operation ESM Monitoring
Stage 7 Assessing Satisfaction				Post Implementation Review Workshops
Stage 8 Improving Performance				Network / Middleware Reconfiguration

Table 1. WUC PDF Tasks and 8-Stage Model Mapping

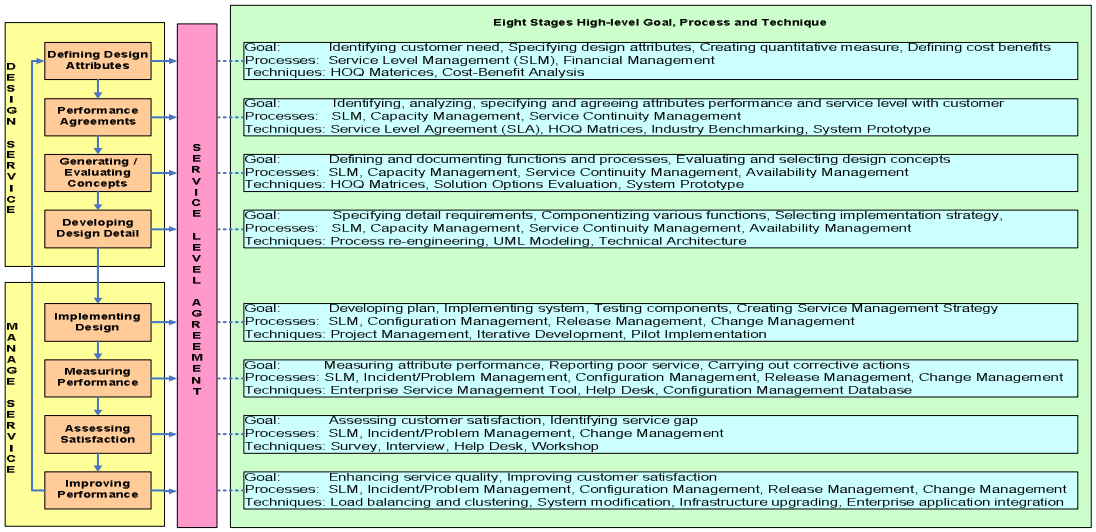

Figure 3. The Integrated IT Service Management Methodology

House of Quality Matrices – In order to translate the vague terms like "right" or "good" to quantitative values, it is necessary to use some kind of systematic modeling tactics. For this purpose, we use by way of example the House of Quality matrix (HOQ-Figure 4). HOQ will be used extensively in this methodology. House of quality conceptualizes the process of arriving at user needs, and service specifications, from a set of visual rules. The rules are as follows [9].

The process of specifications is: talk to the customer in Room #1 (away from technical designers). Then take the designers or the implementers of the systems into another Room #2, and talk to them separately about the competing services available for that purpose. If the two groups are brought together it is quite possible that user group may feel inhibited due to the lack of technological knowledge, and not spell out the requirement clearly. Then one can combine the data generated from the consultations with the customer and technical people and using some simple calculations, to be specified later, arrive at the requirements. The visual paradigm of HOQ is organized in eight compartments of thinking (rooms). This compartmentalization and subsequent systematic correlation helps in deriving the specification in an unattached, objective manner.

The next step, in Room #3, is to rank the needs according to their levels of importance. One can assign some kind of a notional value, or a ranking factor to each of these needs. Relationship matrices are defined with design

characteristics as rows, and needs as columns. This is followed by deliberations in Room #4 on the extent to which the already ranked needs are satisfied by competing services.

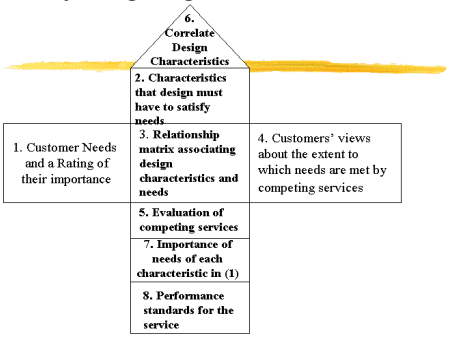

Figure 4. House of Quality (HoQ) Matrix [9]

Once that is done, move into Room #5 where one needs to ask the viewpoints of the designers. This is followed by deliberations in Room #6 where designers are asked to define the alternatives against some criteria for comparison. Once that is done, customers view the matrix in Room #7 to check on the extent to which needs are met by the competing services. Finally, in Room #8 quantitative benchmarks are specified for the management of the service under consideration.

Therefore, QFD matrices provides: a structured method for defining quality standards early in the design process; a system for incorporating quality standards in the service design methodology; a technique for the propagation of the quality throughout the service lifecycle; and establishment of quality relationships at different levels of service parameters. HOQ matrices can be used in different stages of the 8-Stage Model. The next section illustrates the application of HOQ in stage 1 of the model.

HOQ in Stage-1 – Application of HOQ in stage 1 involves: first, understanding customer needs - HOQ Room 1; second, generating design characteristics - HOQ rooms 2 /3; and third, determining important attributes - HOQ rooms 6 / 7. HOQ helps us perform the process of arriving at service specifications in several steps: firstly identify customers needs; secondly identify designer attributes; and thirdly assess how the competing services meet customer needs, and finally one can arrive at the performance specification of that service.

The relevance of HOQ in stage one is illustrated next. Room #1 helps in understanding customer needs. Room #2 & 3 help with design specifics. Room #6 and 7 help in finalizing the house of quality matrix. And finally the e-healthcare service standards are arrived at in Room #8. We now detail how Stage 1 is handled for this case study.

WUC Illustration – The Call Center application of WUC was implemented in an iterative fashion. Before starting the implementation, the service delivery team defined the iterations based on a quantification exercise illustrated as below. Prior the service implementation, the customer care business division identified 4 business functions that needed to be implemented: Fault Reporting, Bill Payment, Customer Enquiry and Analytic Reporting. They also ranked them, Fault Reporting was the businesses' major concern, and was given 4 points; Analytic Reporting is the least important functions, only 1 point was given.

In the mean time, the IT service delivery team identified several technical attributes to measure, such as Ease of Use, Response Time, Key Stroke Times, Information Quality, and Screen Vision Effect. And then, business users were asked to mark the attributes for all functionalities using a scale of 1 to 5 points. From the normalization calculation (Table 2), we understand that high information quality is the most important attribute for this service, and customer is not really concerned with user interface look and feel in the first iteration; all other attributes have similar importance, need to be considered equally. Based on the result, the delivery team was focusing on providing high quality data to customer care staff in the first version of this system. This has helped WUC in meeting user needs and expectations.

4.3.2 Stage 2 - Performance Agreements

The main tasks of this stage are to document service attributes in business terms, and to seek agreement with customers. Other activities include identifying customer performance expectation, analyzing industry benchmark, testing technology capability, and establishing performance and satisfaction relationship.

In addition to performance targets, capacity growth and service continuity plan should also be discussed and specified in the SLA. A range of techniques, i.e. quantification matrices, benchmark comparison, technology prototyping, should be employed to ensure that SLA meets business requirement and technically achievable.

Function	Ease of Use	Quick Response Time	No Screen Scroll	High Information Quality	Good User Interface
Fault Reporting (4)	4	3	5	5	2
Bill Payment (3)	4	5	3	5	2
Customer Enquiry (2)	3	3	4	3	2
Analytic Reporting (1)	2	2	1	4	5
Calculation	4*4 + 3*4 + 2*3 + 1*2 = 36	4*3 + 3*5 + 2*3 + 1*2 = 35	4*5 + 3*3 + 2*4 + 1*1 = 38	4*5 + 3*5 + 2*3 + 1*4 = 45	4*2 + 3*2 + 2*2 + 1*5 = 23

Table 2 - WUC Project Portfolio Management Business Prioritization Matrix (Sample)

WUC Illustration – In the WUC Field Resource Management (FRM) application, there are two steps to identify SLAs: first, benchmark has to be set for the FRM system, and then multi-level SLAs can be defined and agreed.

To setup benchmark, field crews are asked to rate (on a scale of 1-5, in ascending level of importance) different competing solutions for FRM features; 15 parameters were considered, but we will only use the Work Detail and Driving Direction attributes here to simplify the description. Between these two, field crew would like to have more repair work details to complete the work more efficiently; driving direction is less important since they all have printed maps in their trucks. To simplify the description further, we will also only assess the MDT solution and mobile phone based Manual system.

	Field Crew Importance	MDT Solution	Mobile Manual Solution
Work Detail	5	5	2
Driving Direction	4	5	3
Calculation		5*5 + 4*5 = 45	5*2 + 4*3 = 22

Table 3. WUC FRM Benchmarking Sample

As we can see in Table 3, because the Manual solution totally relies on the work scheduler effectively commutating with the field crews about work detail and driving direction, it is not really reliable; the score is very low. On the other hand, work details and driving directions can be dispatched onto the MDT screen in their trucks, field crews felt that they have much more accurate information, this solution also reduced their work related health and safety concern, i.e. answering their mobile while driving, so they gave it a relatively high score. By comparing these two solutions, we can identify the MDT system as the base benchmark; the new FRM system must provide more features and better performance to exceed the MDT system.

At WUC, Service Level Agreement is usually calculated according to benchmark, user expectation, and current technology support, on different weight scale. Table 4 is taken from the FRM SLA identification matrix. Because of cost constrains, negotiation is often required between business and IT to agree upon each attribute. For example, in Table 4, current WUC technology cannot provide user expected service level on Response Time, but it can be increased through hardware upgrading, however, it can only be increased to 1.8 sec giving the current hardware infrastructure budget allocation cycle.

The FRM system consists of many sub systems, we need to drill down the service level from system level, to sub-system levels, and then to components levels, for example the wireless network service level, the integration backbone service level. The beauty of this whole process is that the same quantification matrices can be used to derive the performance standards at each level. So this is a hierarchical multiple-level technique used to arrive at the quantitative design parameters for a service situation, the performance standard of one level becomes the user needs and expectations for the next level of design. For example, the 99.5% availability system service level becomes user expectation when quantifying wireless network sub-system service level.

4.3.3 Stage 3 - Generate/Evaluate Concepts

There are two main sets of activities in this stage: defining business requirements, and selecting service solution. To define business requirements, two tasks need to be performed in sequence, specifying key functions needed to provide the service, and designing and re-engineering business processes. Concrete functional requirements will be documented after the first activity set. The main tasks for selecting service solution are: creating design concepts for the service, and evaluating these potential solutions based on functional and non-functional requirements. The target is to select a solution providing better service with less cost.

To evaluate solution options, both functional

and non-functional performance attributes need to be evaluated; in addition, capacity growth, business continuity and service availability should also be considered. Templates should be established and utilized to assess these solutions in a standard and consistent manner; Proof-of-concept implementation may be engaged in this stage. One of the main techniques used for evaluating various concepts and selecting best solution, is the Pugh method, which is a prioritization scheme for possible solution options as described in [9]. To use Pugh Matrix, an evaluation team must be established; the team then will define a list of evaluation criteria, and set up a matrix; usually, the options are scored relative to criteria using a symbolic approach, for example, using "+" for better than, "S" for neutral, and "-" for worse than baseline; these get converted into scores and combined in the matrix to yield scores for each option; comparison of the scores allows the evaluation team to choose the best solution.

WUC Illustration – WUC IT uses a similar approach to evaluate and select solution options, even though there is no baseline for comparison. There are 4 steps to evaluate and select the best strategy. First, the service delivery team, normally consisting of business representatives, solution architect, and IT operation managers, works together to generate solution options. The service delivery team then identifies evaluation criteria, and then discusses and marks solution options against each attribute using "*" symbol, normally in 1 (worst) to 3 (best) scale. At last, the service delivery team calculates the total score for each option, and selects the option with highest score. If there are solution options with similar score, the delivery team will either add more attributes, or remark the existing scores, until there is a winner. Table 5 shows a simplified version of the IT Service Delivery Solution Evaluation Matrix for a data-warehousing project. It is worth to note that, unlike the Non-Functional Requirements, which can be quantified by comparing among the solution operations and evaluating against standards and benchmarks, the Functional Requirements assessment are more intuitive, largely depend on the experience and perception of the individuals in the service delivery team. Often business end-users in various levels are asked to participate the process. In addition to documentation, proof-of-concepts are used to help marking.

	Response time	Availability	DR time	Load
Benchmarking (10%)	1 sec.	99.99%	30 minutes	300 concurrent user
User Expectation (60%)	1.5 sec.	99%	60 Minutes	200 concurrent user
Current Technology support (30%)	2 sec.	99.5%	45 minutes	400 concurrent user
SLAs	1.8 sec.	99.5%	45 minutes	At least 200 users

Table 4. WUC FRM SLA Identification

Ref No	Functional Requirements	Option 1	Option 2	Option 3
1.	Automatic updating of data store on a daily incremental basis.	**	**	**
2.	User-friendly quarterly reporting capability for nominated standard reports.	***	*	**
3.	The ability to export electronically standard and non standard reports in different formats (i.e. excel, html etc)	***	***	***
4.	User-friendly ad-hoc reporting capability.	***	***	**
5.	Training for Urban Growth staff and relevant staff in other Divisions	**	*	*
	Non-Functional Requirements			
1.	Availability	***	***	*
2.	Backup & Recovery	*	*	*
3.	Capacity	*	*	*
4.	Design Constraints	*	*	*
5.	Disaster Recovery	**	*	**
6.	Interfaces	**	**	**
7.	Reliability	**	**	**

8.	Security	**	**	**
9.	Service Level Requirements	***	***	*
10.	Performance	***	**	***
11.	Software Licenses	**	***	***
12.	Support Requirements	***	***	**
13.	Usability	***	*	**
14.	User Documentation	***	*	***
15.	Fit to Enterprise Architecture standards	**	***	*
	Overall Assessment	46	39	37

Table 5. WUC IT Service Delivery Solution Evaluation Matrix (Sample)

4.3.4 Stage 4 - Developing Detail Design

The main task of this stage is to carry out detailed solution design based on the SLA. Apart from enabling business functions, the design has to pay attention to performance, capacity, continuity, availability, scalability, maintainability, traceability, and other non-functional attributes. At this stage, we use software engineering techniques, such as design patterns, UML modeling, technical architecture, object-oriented development etc.

WUC Illustration – WUC has established effective enterprise architecture and technology standard. These governance guidelines ensure that all new IT services are implemented in highest technical capability. WUC IT is also moving its network and hardware infrastructure management towards a utility computing model, to further standardize IT operation environment and reduce service delivery cost. On top of that, WUC IT is also building a reusable application infrastructure, i.e. the system integration backbone, to simplify individual service design tasks.

4.3.5 Stage 5 - Implementing Design

The main tasks in this stage are to implement the IT service based on the detailed design in the previous stage. Project management and software engineering artifacts, such as project plan, communication plan, test plan, transition plan, and deployment plan are utilized to ensure the implementation quality. Among these artifacts, the most important ones are the Service Management Plan, and System Instrumentation components.

WUC Illustration – As service monitoring and measurement technical standard, WUC IT requires that all applications must have system instrumentation capability. For example, all in-house build applications must implement The Open Group's Application Response Measurement (ARM) standard. They also put system instrumentation and measurement capability as mandatory evaluation criteria for all COTS packages.

In addition to instrumentation, WUC IT also requires a Service Management Plan (they call it Technical Architecture Document) is produced by the delivery team before the service's production deployment; some of the parameters required in this plan are: Security, Availability, Capability Planning, Backup and Recovery, Network Prediction, Logging, Monitoring, Performance Tuning, Self-Diagnosing, Transaction Management, Configuration Management, Problem Resolution, etc.

4.3.6 Stage 6 - Measuring Performance

The ultimate goal of this stage is to meet the SLA. This involves constantly measuring performance attributes, immediately reporting poor service, promptly carrying out corrective actions. The measurement should be performed at three levels: Application, System (Middleware), and Network. The assessment is in terms of three measures: Cost, Quality and Time. The measures are for three quality areas: Effectiveness, Capability and Efficiency.

ITIL best practices can be used here. For example, Incident Management principles are used to promptly address any service issues raised by customer. Problem Management guidelines make sure that problems can be identified proactively based on root-cause analysis. Configuration Management best practices make sure that any changes are recorded. Integrating Change Management standards help with the evaluation, and analysis of various changes. In addition, Enterprise System Management (ESM) tools are used for the monitoring and measurement processes.

WUC Illustration – WUC has implemented HP OpenView as its enterprise-wide ESM tool. As discussed earlier, because WUC enforces a system instrumentation methodology, performance monitoring and measurements across all applications, systems and networks are consistent.

WUC IT has also defined procedures based

on the ITIL best practices to deal with incidents and problems in both event-driven proactive and user-driven reactive ways. Proactively, WUC ESM tool (HP OpenView) constantly monitors network, platform and applications. In the event of an abnormal behavior, the ESM tool sends a message and triggers the Problem Management process. A root-cause analysis is carried out by operation specialists to prevent incidents. Reactively, end user raises service incidents with the IT Help Desk staff, who register them into the Incident Management system, which in turn triggers the Problem Management process. Another important feature in the WUC Incident / Problem process model is the implementation of an "Error Database", which is used to record common incidents and solutions. The introduction of this "Error Database" has significantly reduced incident resolution time.

4.3.7 Stage 7 - Assessing Satisfaction

The goal of this stage is to assess customer satisfaction, identify service gap, adjust performance attributes, and modify measurement level. These processes should be carried out against existing services performance, increasing customer expectations, and current industry benchmarks. For example, a new product in the market may have changed customer expectations substantially. Service Level Agreements need to be modified; correction activities in service delivery and management need to be identified. Techniques, such as surveys, interviews, workshops, and observations, can help to gather information; trend analysis and market research are also used.

WUC Illustration – WUC IT has defined two means to gather information and assess customer satisfactions. First, IT Help Desk does not act only as the central contact point for service incidents reporting and change request enquiry. Procedures have been established for IT help desk to periodically gather user feedbacks via telephone calls or email surveys. This is the informal means. The formal means involve monthly service assessment workshops attended by IT and major business divisions. In these workshops, IT staff present the Service Measurement Report from the previous month, and carry out group interviews. Quite often, business users raise concerns and express expectation. The new requirements are then discussed further to identify required actions. For example, since the Call Center application went live about eighteen months ago, business users have made several change requests to improve performance and add new functionalities.

4.3.8 Stage 8 - Improving Performance

The goal of this stage is to improve service quality and further enhance user satisfaction level based on ever-changing customer expectations and technology advancement. Both new technologies and technology upgrades should be considered, business process reengineering should also be looked at. Change Management, Release Management, Configuration Management guidelines are available to guide the process. However, we have to understand that any performance improvement has cost associated with it; relationship between strategic financial objectives and overall customer satisfactions must be established to justify the benefits.

WUC Illustration – At WUC, each IT service must establish an asset plan as part of the capacity management. These asset plans involve upgrade paths for both the core applications and related technologies that are reviewed on a yearly basis. These asset plans are also used as a base for the business and IT to allocate funds for the performance improvement of existing services. For example, the FRM core application must be upgraded after 12 months of its initial deployment to leverage new features, especially the fast changing wireless networks. In the mean time, the Integration Message Broker, part of the WUC integration backbone, is also scheduled for upgrade.

5. Discussion

This Integrated ITSM Methodology introduces a generic process framework, and defines business-level techniques for the specification of service management requirements. This 8-stage model provides a foundation for organizations to customize their own ITSM methodologies based on individual organization needs. It is expected to facilitate the ITSM adoption by providing a standard end-to-end process. In the WUC case, even though its PDF framework is slightly different, but it follows the same principles as the Integrated ITSM Methodology: providing end-to-end processes model and covering both service delivery and management; utilizing industry best practices, such as ITIL.

The ultimate goal in each of these 8 stages is about the definition and negotiation of SLAs. Currently, there are no other methodologies to address this problem in a service-independent manner. This customer centric approach ensures

that customer expectations can be addressed in an orderly and timely manner without getting confused with technological jargon of service management systems that help with the monitoring of SLAs. Another strength of this methodology is the utilization of quantification techniques, such as TQM/HoQ matrices. These top-down quantification matrices allow us to convert unclear, interpretable quality attributes into definite, measurable service management parameters. By quantifying quality parameters, communication can be improved; ambiguity can be removed between business and IT.

6. Conclusion and Future Work

This paper has examined IT Service Management from the perspective of deployment in real businesses. We identified the need for a unified methodology for the implementation of integrated service management from a business perspective, and presented an 8-stage methodology for the management of services. This involved the use of Total Quality Management (TQM) techniques, such as HoQ for the quantification of qualitative service parameters, and the use of ITIL building blocks for service management processes. The methodology integrates software engineering techniques, such as design patterns to develop IT solutions from a service business perspective. We believe this methodology has the elements to integrate service management that is so important in today's dynamic business environment involving frequent acquisition and mergers [12]. It was not possible to describe some elements in further detail due to space constraints.

We illustrated the above methodology with a case study on a large utility organization in Australia. The study has shown that it is possible to map existing business processes in an organization to the 8-stage service management model that would help design service management solutions irrespective of the type of business or the type of the technological infrastructure. This methodology is now being tested in other organizations and the results would help with wider deployment [17].

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