5-2008

An Investigation of a Framework for the Implementation of Service Management in the Information and Communication Technology Sector

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Abstract

The true value of Information and Communication Technology (ICT) can only be realised when it provides solutions that meet or exceed the client's expectations. The successful management of services includes maintaining service levels, which involves defining and satisfying customer requirements. Service Management is a misunderstood dynamic process with key elements and associated problems. This paper identifies the requirements for a Service Management framework and proposes a two phase framework for its implementation. These two phases are the preparatory phase and the managed services phase. The preparatory phase is characterised by the absence of a client and the development of a Service Catalogue. The managed services phase pivots around the client and the Service Agreement.

Keywords

Service Management, Service Level Management, Service Agreements, Service Level Agreements, Service Catalogue.

1. Introduction

Organisations face problems when attempting to implement Service Management (SM). These include a lack of SM understanding, difficulties with Service Agreements (SAs), people issues and a legacy of failure (Sturm, 2002a; The International Engineering Consortium, 2002; Erickson-Harris, 2003 and Hautamäki, Lahteenmäki and Rimpilä, 2004). Further, the successful implementation of SM requires the adherence to a recognised and appropriate strategy. A number of elements of SM require careful consideration. These elements include SAs, Operational Level Agreements, Underpinning Contracts, tools, monitoring, reporting and a Service Catalogue. Successful SM can be identified by key indicators and implemented by applying a holistic framework.

Initially, this paper provides a definition of SM, which is extracted from a myriad of vendor specific definitions. Further, key elements of SM are identified and current SM problems are presented. The indicators of successful SM are presented. Finally, a framework for SM implementation is presented.

2. Service Management Defined

Service Management and Service Level Management (SLM) are terms that are used interchangeably in the literature. The same applies to Service Agreement and Service Level Agreement (SLA). For the purposes of this paper, SM is seen to refer to a holistic strategy that covers all aspect of managing services. SLM therefore describes the management of a specific service to a specific level. The same distinction can be drawn between SA and SLA. An SA is seen as a single document that accommodates all that is relevant to an agreed business relationship. An SLA represents the documentation of that which is relevant to a

level of service assigned to a particular activity or business process. An SA can therefore contain any number of individual SLAs.

Service Management is defined as the process of negotiation, Service Agreement articulation, checks and balances, and reviews between provider and client regarding the services and service levels that support the client's business processes. An SA is therefore a contract between a provider and a client documenting the business processes as well as the supporting services, service parameters, acceptable/unacceptable service levels, and liabilities on the part of the provider and the client, and actions to be taken in specified circumstances (Lewis and Ray, 1999).

Service Management is the means for managing technology according to business goals and objectives. Using SM, Information and Communication Technology (ICT) organisations commit to a given level of service and measure performance against that commitment, thereby helping to reduce operational expenses and improving the contribution of ICT in building corporate revenue (Boardman,, 2001; Sturm, 2002a; The International Engineering Consortium, 2002; Erickson-Harris, 2003; Sturm and Erickson-Harris, 2003; ITIL, 2003 and Hautamäki, Lahteenmäki and Rimpilä, 2004).

In light of the above and for the purposes of this paper, SM is defined as a cyclical and collaborative process. It is initiated by the verification of the service provider's capacity to manage services. This is followed by a process of: understanding and defining a client's requirements; negotiating, creating, deploying and refining SAs; real-time monitoring and reporting of service levels. This is done within a framework of accountable costs, continual service level improvements and perpetual development of the business relationship.

3. Elements of Service Management

The primary goal of every ICT service organisation is to provide services that are aligned with and in support of a business's strategy and objectives. Since many of today's businesses operate in a dynamic environment, this goal has become progressively elusive. Increasingly, ICT service providers can only support business needs by having appropriate SM. Six key elements impact on the success of SM (LaBounty, 2004):

- Service Agreements
- Operational Level Agreements
- Underpinning Contracts
- Reporting
- Service offerings (Service Catalogue)
- Technology and toolsets

3.1 Service Agreements

Service Agreements are flexible and adaptable contracts that are directly aligned with business goals. SAs are a necessary component of ICT and specify the performance parameters within which a network service is provided (Muller 1999).

An SA is a legally binding document between two parties that specifies the conditions of the business relationship between them. An SA is a precise statement of the expectations and obligations that exist in a business relationship between two organisations: the service provider and the client (Verma 1999).

According to the International Engineering Consortium (2002), SAs are contracts between service providers and clients that define the services to be provided, the metrics associated with these services, the acceptable and unacceptable service levels, the liabilities on the part of the service provider and client, and the actions to be taken in specific circumstances.

3.2 Operational Level Agreements

Service Agreements alone do not ensure the timely delivery of services as needed by the business. Operational Level Agreements (OLAs) need to be crafted between related ICT departments in order to unify ICT service delivery throughout an organisation prior to executing customer SAs.

Operational Level Agreements establish specific technical, informational, and timeframe requirements needed for each ICT department to provide the services that will be delivered to the customer. Without OLAs in place, SAs frequently promise services that are impractical at best or impossible at worst.

3.3 Underpinning Contracts

For services provided by third-party vendors or service providers, Underpinning Contracts (UCs) need to be developed. Underpinning Contacts are similar to OLAs in that they complete the chain of accountability and control for seamless service delivery. ICT service organisations may enter into contractual agreements with their third-party vendors, and convert the pertinent data into a UC that complements their entire SM process.

3.4 Effective Reporting

Reporting efforts need to complement the key measurements in SAs, OLAs, and UCs. Reports that show the overall SM performance must be communicated upward to ICT management, as well as to the customer's management. Effective SM reporting is the medium of communication that demonstrates the value of ICT and business alignment.

When the Service Provider is measuring and reporting the appropriate things, performance reporting can efficiently modify service behaviour, provide incentive, and reward the achievers in a consistent fashion throughout ICT. The net result is a more satisfied and effective workforce.

3.5 Service Offering

As the ICT requirements of an organisation grows and develops, a comprehensive list of services currently being provided, or to which customers each service applies, may not exist or be difficult to craft. In order to establish an accurate picture of all ICT products and services currently provided, a clear definition of ICT Service Offerings should be produced. Such a catalogue should list all of the products and services being provided, as well as a summary of their characteristics and details on who supports each product or service.

3.6 Enabling Toolset

SM is almost entirely based upon processes; therefore, many ICT service managers mistakenly assume that, with the exception of reporting tools, SM can be performed manually and through effective communications alone. This is a grave mistake that is a common reason why SM fails in organisations. SM is an ICT enterprise-wide initiative that is much too complex to monitor and maintain manually. The volume of data alone is much more than can be handled manually.

Appropriate SM creates a stream of data that shows the flow of every service transaction through the SM process. A robust toolset (including those for reporting), is essential for the provider organisation to manage services.

3.7 A Service Catalogue

A Service Catalogue is the detailed service description for the service offerings. An SA includes major and mission-critical services that are well-defined, measurable, and in a negotiable state, (ITIL, 2004a).

The goals of a Service Catalogue are to:

- Detail an inventory of all ICT services that are provided to the organisation
- Enable an optimized, service focused organisation
- Describe and document a well-defined and effective set of tailored processes and methods that are supported enterprise-wide and are continuously improved
- Provide an integrated set of people, process, and technology that is well-established, can be integrated into the organisation, enterprise-wide, and continuously improved as needed

Specifically, maturity within ICT SM is denoted by the development and maintenance of a Service Catalogue that includes identifying and qualifying the types of services being provided and integrating service level objectives and agreements information that employs a business and customer service focus (ITIL, 2003).

4. Current Service Management Problems

Unfortunately, many SM initiatives fail (Boardman, 2001). Such failure can be attributed to ten key factors.

4.1 Misinformation and Misunderstanding

Boardman (2001) suggests that while the benefits of integrated management of service levels are significant, the foundations on which they are built are increasingly fractured and lacking in standards support. Sturm (2000) further cautions that while SM, including Quality of Service (QoS), SAs and service assurance, have attracted attention, misinformation and misunderstanding prevails, based on five SM myths:

Myth 1: Service Agreements equals Service Management
It is acknowledged that SM can be successful without SAs, yet cautions, on the other hand, that SAs in the absence of SM are meaningless.

Myth 2: Service Agreements will make users happy
SAs are not a panacea, recognising that an SA is a way to set expectations and communicate about the services that are being delivered.

Myth 3: Service Agreements will result in higher service levels
By itself, an SA can not directly produce any changes in the levels of service delivery. Improvements in service levels may coincide with the establishment of SAs, due to paying closer attention to services and the improvements in communication during the negotiation phase.

Myth 4: Penalty clauses in a Service Agreement will guarantee service levels
Penalty clauses act as incentives to service providers as well as define appropriate compensation when service levels are not met. In reality, however, it is very difficult to negotiate penalty clauses that meet these two objectives. Difficulty exists in extracting these penalties without the assistance of costly legal action.

Myth 5: Service Agreements are not necessary when outsourcing ICT functions
This level of trust is both naïve and could be considered as negligence on the part of the managers.

4.2 Service Agreements

The development of SAs is a most difficult process, (ITIL, 2003). SAs are not consistently and accurately defined, documented and monitored, nor are regular reviews held. As a result, potential service improvements are not realised and SAs may fall into disuse. It is more difficult to resurrect SAs or to re-launch SM. Consequently, it is far better to recognise the potential difficulties in advance by putting correct monitoring in place.

SAs establish a negotiated and agreed upon two-way accountability for service. They build credibility for the service organisation by indicating how serious they are about providing support. Yet while many organisations understand the vital role played by SAs, many are unaware or unwilling to dedicate the amount of resources required to maintain them (LaBounty, 2004).

4.3 Reporting

Reporting efforts need to complement the important measurements in SAs. Reports that show the overall SM performance must be communicated upward to ICT management and ICT middle management, as well as to the customer's management (LaBounty, 2004). Effective SM reporting is the medium of communication that demonstrates the value of ICT and business alignment, serving as a management tool (LaBounty, 2004).

Reporting to clients about performance is a key monitoring aspect of SM (Sturm, 2002b). Unfortunately, much of today's ICT reporting is of limited worth as the associated reports are usually filled with technical data that has little, or no, value to the client. Reporting can be done periodically or in real-time, the latter enjoying first priority. A critical aspect of SM failures is a lack of attention given to the development of reporting structures.

4.4 The Semantic Disparity Problem

Lewis (1999) acknowledges that while there are methods and challenges regarding SM, it involves two competing strains the so-called Semantic Disparity Problem:

- Parameters that are easy for network specialists to measure do not translate well into parameters that are readily understood by ordinary clients.
- Parameters that are easily understood by ordinary clients are not easy for network specialists to measure.

It is suggested that there is little new in this distinction, crediting Albert Einstein's observation that "not everything that can be counted counts and not everything that counts can be counted".

4.5 People Issues

In a recent global online survey conducted among a cross section of ICT professionals and managers by International Network Services, Blum (2002) determined that limited improvement in satisfaction has occurred with SM capabilities from 1998 to 2002. In this survey, 96% of respondents registered the importance of improving the organisation's SM capabilities as "Very" or "Somewhat" important.

According to this study, people issues are the biggest challenge to implementing and improving SM. In describing people issues, training, workflow and role definition are included. Blum (2002) regards processes such as trouble shooting, escalation and documentation as the second biggest challenge identified by respondents during the online survey.

In asking why so many clients are unhappy with the quality and cost of ICT service delivery, Microsoft (2003) question whether service delivery is so bad, or the symptoms of poor communication between ICT service providers and their clients being manifested. They suggest that SM can indeed be used to improve communication.

4.6 Fluid Business / Static Service

The business processes that are supported by services are continually changing. However, service provision remains the same. The result has been a widening gap between the services offered and their usefulness to the business units, (Lewis 1999).

4.7 Inefficient or Non-Existent Change Management

Change requests should be managed through a formal, customer-facing change management process. Often, however, internal ICT groups avoid this formal process, (Lewis 1999).

4.8 Disunity

Change management is often a symptom of a deeper cultural problem. Without a unified vision for ICT service, each business unit develops its own vision and may contradict the vision and goals of the other groups. The result is that, over time, political barriers form that can lead to cumbersome procedures that are often burdened with a protective hidden agenda. As ICT groups hoard their knowledge, support often takes longer, and as a result, the true, united capabilities and service value of ICT are unknown to ICT or its clients, (Lewis 1999).

4.9 The Deception of Customer Satisfaction

It is important to measure customer satisfaction at the service transaction level. This does not necessarily measure how well ICT services are aligned with business needs as many ICT support managers have been deluded by good customer satisfaction scores that relieve them from engaging in continuous dialog with their customers.

4.10 The Legacy of Failure

Many organisations can attest to failed ICT Service Agreements (Sturm, 2003). In these organisations, several identified SAs took months to create. The customers are most cooperative in telling ICT service providers what they need, and the service provider creates the SAs. The results are documents that are somewhat complex, requiring work to monitor and maintain. Additionally, these agreements call for a system of measurements that are meaningful for the business units, but require data from the ICT service provider that is time consuming to assemble.

Eventually these SAs are locked in a drawer and became obsolete documents. They are not monitored, and no continuous feedback process, to the stakeholders involved, is in place. The result is a lack of accountability between all the ICT departments involved. ICT service providers must establish a link between service performance and business performance.

5. Successful Service Management

Successful SM involves the definition of client expectations, the satisfying of those expectations and the perpetual refining of this business agreement (Sturm, 2001). The key indicators of successful SM are the successful mapping of services to client requirements, the sustained provision of services, mutually beneficial client/provider relationship and a shared strategy.

5.1 Successful Mapping of Services to Client Requirements

A key ingredient of successfully providing services is recognising the services that can be provided and then mapping them to the client's requirements. The ITIL (2004b) recognise the importance of this, declaring that service management ensures that ICT services are aligned with the business needs. This introspection is a fundamental building block of successful SM.

A service provider who has not clearly identified and documented their service capabilities before attempting to map them to the client's requirements is least likely to successfully manage those services.

5.2 Sustained Provision of Services

In order for provided services to be successful, they need constantly to satisfy a requirement (Sturm, 2003). If the requirements are not satisfied, then the provision of services is likely to be terminated. A relationship therefore exists between the success of service provision and the duration of the client / provider relationship. That is to say that as long as clients are being provided with services that meet their requirements, they will remain satisfied. Conversely, if the provision of services is not sustained, then this could be representative of unsuccessful service management.

5.3 Mutually Beneficial Client / Provider Relationship

The essence of the success of SM pivots around the nature of the relationship between client and provider (Lewis, 1999; Lewis and Ray, 1999; Brittain and Matlus, 2002; Sturm, 2003 and ITIL, 2004). Successful SM is possible where this relationship has mutual benefit. Where benefit is mutual, the motivation to sustain the relationship is also mutual. This provides the foundation for a successful partnership built on a managed services environment.

5.4 Shared Strategy

A further foundation stone of a successful SM environment is the presence of a shared strategy. Partnerships are built on a shared vision or strategy that unites the two parties. If the service provider and the client share a mutually beneficial business strategy, the success of the managed services is likely to be more attainable (ITIL, 2004).

6. A Framework for Service Management

An SM framework includes the ICT management process that helps the organisation to provide continuously improving service levels for business services from an end-user's perspective (Blum, 2002). The result of a carefully tooled, well-guided SM framework is improved quality with regard to the level of service provided, which then can be replicated successfully to other business services and business processes. Further, when followed, SM ensures that the lines of communication between ICT and business stay open as they continue to work together to improve and refine SAs as new business needs and priorities change, changes in the ICT environment occur or the cost of providing established levels of service change (Blum, 2002).

In order to establish and maintain successful SM, ICT managers need a well-defined process that is founded on a disciplined service culture (BMC Software, 2004). The clear business rules, proven tools, and methodologies provided by SM help drive ICT service operations toward alignment with the business (LaBounty, 2004; Sauer, Liu and Johnston 1999). Sturm, Morris and Jander (2000) and van Hemmen (2000) acknowledge that the successful implementation of SM is more than purchasing some software and placing a service contract on the desk of the department head. They acknowledge that it requires a strategy. This strategy has an organised and flexible plan for introducing SAs and working with them day to day to achieve maximum efficiency and savings. Enterprise Management Associates (2002) recognise that knowing where to begin with an SM implementation is a challenge, suggesting that mission critical applications are ideal candidates for starting on the SM path.

7. Key Components of a Service Management Framework

The presence of an SM implementation framework is of fundamental importance to the success of any subsequent service management initiative. The following five key components are recognised as important in such a framework.

7.1 Readiness to Provide Services

The provider organisation must be ready to provide services (ITIL, 2003). In order to do this, the provider organisation must have a detailed understanding of their service offerings, with respect, to their capacity to offer, manage and sustain services.

7.2 Eliciting Client Requirements

The accurate elicitation of client requirements forms the basis of the relationship between a service provider and a client, defining the terms of reference. Ensuring that the client's requirements are identified and acknowledged ensures that there is a basis for the development of a business relationship (Sturm, 2002a).

7.3 Understanding, Managing and Documenting Client Requirements

Management is most straightforward when the requirements are well understood and easily described, and also the means of satisfying them is clear (Janssen and Jona, 2004). Once elicited, requirements need to be understood by both the client and the provider. The management of client requirements includes the verification of the validity and business relevance of each requirement. The documentation process is undertaken by both the provider and the client (Janssen and Jona, 2004).

7.4 Satisfying Client Requirements

Once the client's requirements are elicited, understood, managed and documented, the managed service environment can be identified. The next step in the process is to implement the services to satisfy the client's requirements (Sturm, 2002a).

7.5 Improvements in Services and Business Relationship

The managed services environment should make provision for improvements in services. Initial service levels can be regarded as a benchmark against which improvements can continually be made. A mutual commitment between client and provider to plan for improvements will improve the business relationship (Janssen and Jona, 2004).

8. Service Management Framework

The literature survey suggests a two stage framework for implementing SM. The initial phase is characterised by the introspective activities required to place the organisation in a state of service management readiness. This phase is also done in the absence of clients. The latter phase is where a client is engaged and ICT services are being managed.

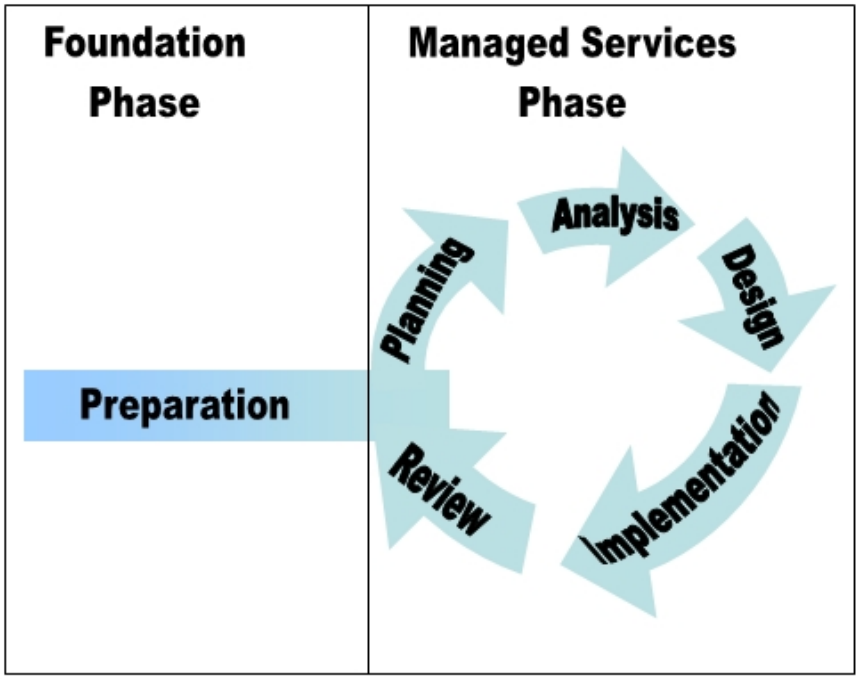

Figure 1: Service Management Implementation Framework

The relevance of an ICT implementation framework is of equal value to service providers as it is to service recipients. In many instances, the providers may also be clients. While the perspective of a service provider may differ from that of the client, the success of the service provision depends on the application of the implementation framework. While the service provider needs to complete the activities identified in the foundation phase, the client needs to seek evidence of the completion of these activities. The managed services phase involves the interaction between the provider and client. The phases and steps identified in the proposed framework below are therefore of relevance to both service providers and clients.

The Foundation Phase comprises all the preparatory activities required for the implementation of SM. These preparatory activities do not result in an environment wherein services are effectively managed. Rather, this initial phase places an organisation in a position of readiness to provide and manage services.

The Managed Services Phase is characterised by a lifecycle of activities that are required when implementing an individual SM project. This cycle is initiated by the planning step and originates from the preparatory activities. This cycle continues through Analysis, Design and Implementation steps. The cycle concludes with a review step that feeds back into the Preparatory activities in order to provide the necessary feedback into the review of the preparatory activities.

8.1 Phase 1: Foundation

This phase comprises eight key preparatory activities. These activities correspond to the key actions an organisation needs to complete before attempting to provide and manage services. While these activities are interdependent, they are sequential and are of equal priority. These eight preparatory activities are:

- Appoint or nominate Service Management staff
- Define Service Management scope and objectives
- Quantify activities, resources, funding and quality criteria
- Identify risks
- Raise awareness of Service Management
- Develop a Service Catalogue and pro-forma SA
- Identify support tools, especially for SA monitoring
- Set incident priority levels and escalation paths

8.2 Phase 2: Managed Services

Once the SM foundations have been laid, any number of service management projects can be initiated. This phase comprises key steps for the managing of services. While these steps detail a chronological path for an SM implementation, they provide flexibility of movement in both directions.

The Managed Services Phase begins with a link to the Foundation Phase to the Planning step. The Planning step leads into the Analysis, which is followed, in chronological order, by Design, Implementation and Review steps.

8.2.1 Planning

Three key planning activities occur in the implementation of an SM project (ITIL, 2004b).

- Meet with Client
- Establish SM Project Team
- Raise Awareness of SM Project

8.2.2 Analysis

Once all the planning activities are complete, the SM project team can focus on providing a managed services solution.

- Identify Client's Business Processes
- Review Client's Existing Services
- Identify the Services to Support those Business Processes
- Develop a Blueprint of the Client's Service Requirements

8.2.3 Design

With the blueprint of the client's service requirements as a reference tool, the managed services solution can be designed. The primary activity in this step is:

- Negotiate and Create SAs

8.2.4 Implementation

Once an SA has been negotiated and created, it needs to be implemented.

- Deploy SA
- Real-time monitoring of service levels

- Service level reporting

8.2.5 Review

A managed services environment is dynamic. Technology is constantly changing and the requirements of the client are also subject to change.

- Review Service Levels
- Establish Priorities and Plan for Change
- *Fine Tune or Reengineer Business Processes and / or Services*

9. Conclusion

The true value of ICT can only be realised when its services provide solutions that are both practical and reliable. In order to achieve this, these services need to be well managed. This improvement in service management will promote the credibility of the industry while improving customer loyalty and satisfaction. These will ultimately combine to allow the ICT industry to mature and regain much of the ground lost in the late 1990's and early 2000's.

Fundamental to SM is the collaboration between client and provider. This collaboration between the parties forms whilst service level expectations are set and develops into a relationship when service levels are being satisfied. This relationship is then developed further as each party is committed to refining the business agreement. The future development of SM lies in the recognition of the importance of a communicative relationship between client and provider. Successful SM is possible when providers, who are confident of their ability to manage levels of service, and clients who are aware of their service requirements, enter into such a communicative relationship.

In order to develop a business relationship based on a managed services environment, the implementation and management of these services needs to be structured and formalised. A common thread that permeates through the problems associated with service management points to the absence of a formal SM strategy and implementation framework. A further characteristic of these problems is the unsystematic approach that many organisations take towards the management of ICT services.

If organisations wish to manage ICT service levels successfully, they need to adopt a rigorous approach towards the implementation and success of service management.

References

Blum, R. 2002, "Service Level Management and Service Level Agreements", International Network Services, March 25, 2002.

BMC Software (2004), "Improving Service Levels by Implementing Service Level Management – A Practical Guide", White Paper [Online] Available at: www.bmc.com.

Boardman, B. 2001, "Network & Systems Management", Network Computing Volume: 12.17.2001 p.23-34.Brittain, K. and Matlus, R. 2002, "Road Map for IT Service-Level Management", Gartner Research 28 January 2002.

Erickson-Harris, L. 2003, "Help with SLM", Network, World Fusion, July 21, 2003.

Hautamäki, J, Lahteenmäki, T. and Rimpilä, N. 2004, "An Assessment of Maturity Level of the IT Service Management", Institute of Information Technology, Jyvaskyla Polytechnic, 24 January 2004

International Engineering Consortium 2002, “Service-Level Management”, International Engineering Consortium.
ITIL (The IT Infrastructure Library) 2003, “Service Delivery”, Sixth Impression, The Stationery Office.
ITIL (The IT Infrastructure Library) 2004a, “Service Support”, Seventh Impression, The Stationery Office.
ITIL (The IT Infrastructure Library) 2004b, “Planning to Implement Service Management”, Third Impression, The Stationery Office.
Janssen, M. and Jona, A. 2004, “Issues in Relationship Management for Obtaining the Benefits of a Shared Service Centre”, Proceedings of the 6th international conference on Electronic Commerce ICEC '04, ACM Press.
Labounty, C. 2004, “Implementing Service Level Management”, LaBounty Associates.
Lewis, L. 1999, “Service Level Management for Enterprise Networks”, Artech House, INC.
Lewis, L. and RAY, P. 1999, “Service Level Management: Definition, Architecture, and Research Challenges”, Proceedings of Global Telecommunications Conference GLOBECOM’99 1999, 3.p.1974–1978.
Mckeen, J. Smith, H. and Singh, S. 2005, “Developments in Practice XVI: A Framework for enhancing IT Capabilities”, Communications of the Association for Information Systems (Volume 15, 2005).
Microsoft 2003, “Service Level Management”, Service Management Function, Microsoft Corporation.
Muller, N. 1999, “Managing Service Level Agreements”, International Journal of Network Management, Volume 9 Issue 3 1999.
Sauer, C. LIU, L. and Johnston, K. 1999. “Enterprise-Level Project Management Capabilities: A Comparison of the Construction and IT Services Industries”, Proceeding of the 20th international conference on Information Systems, Association for Information Systems.
Sturm, R. 2000, “The Truth About Service-Level Management”, InformationWeek News, 8 May 2000.
Sturm, R. 2001, “The Functions of Service-Level Management”, Network World Fusion, 17 September 2001.
Sturm, R. 2002a, “Look Beyond ICT for Service-Level Management Successes”, Network World Fusion, 7 January 2002.
Sturm, R. 2002b, “Reporting for SLM”, Network World Fusion, February 2002.
Sturm, R. 2002c, “Service-Level Management: What is in ICT for IT?” Network World Fusion, 10 April 2002.
Sturm, R. and ERICKSON-HARRIS, L.2003, “Service-Level Management Solutions: A Buyers Guide”, Enterprise Management Associates, December 2003.
Verma, D. 1999, “Supporting Service Level Agreements on IP Networks”, Macmillan Technical Publishing.