Service Level Management For it Ser-Vices in Small Settings: A Systematic Review

Calvo-Manzano Jose[1], Cuevas Gonzalo[1], Gómez Gerzon[2], Mejía Jezreel[1], Muñoz Mirna[1], Rabbi Md Forhad[1], San Feliu Tomás[1]

[1]*Universidad Politécnica de Madrid, Facultad de Informática {joseantonio.calvomanzano, gonzalo.cuevas, ma.munoz, tomas}*
[2]*Universidad Autónoma de Tamaulipas, Unidad Reynosa Rodhe*

Abstract: *This work presents the application of a systematic review protocol for Software Engineering. This protocol is used as a formal model by applying systematic review to Service Level Man-agement. The objective is to search for papers related to Service Level Management for IT Services in small settings (including small and medium enterprises). Results obtained show that Service Level Management area is an increasing research field and there is a need for more in-depth studies.*
Keywords: *Slm, Itsm, Small Settings, Systematic Review, IT Services.*

I. Introduction

Nowadays, most countries have transitioned from agriculture and manufacturing economies to service based economies. More than 75% of the economies of industrialized nations are based on business services [1]. According to the document "Capability Maturity Model Integration for Service (CMMI-SVC) Overview" published by Software Engineering Institute [2], demand for process improvement in services is likely to grow: services constitute more than 80% of the US and global economy. According to Gartner [3], 80% of the cost of an infrastructure is in service delivery and service support. There-fore, services are gaining significant importance day by day in industry.

Hence, industries need some sort of framework, standards to manage their services, specially the IT Services, because the development of IT has had a greater impact in the processes of businesses in the last years [9]. For this reason, IT Service Management (ITSM) has been developed. ITSM is a discipline for managing information technology systems, philosophically centered on the customer's perspective of IT's contribution to the business. The IT infrastructure needs to be aligned to the busi-ness requirements such that business unit and IT operate in a coordinated effort to achieve the goal of the organization. There are different frameworks for ITSM. Standards, process and evaluation models or framework help organizations to improve the management of their services projects. Some public framework and standards assessed relevant to service management are: ISO/IEC 20000 [13], Infor-mation Technology Infrastructure library (ITIL) [5], Capability Maturity Model Integration for Services (CMMI-SVC) [2], Control Objectives for Information and related Technology (COBIT) [8], eSourcing Capability Model for Service Providers (eSCM-SP) [4].

The previous models consider the IT Services from large companies' perspective. But the fact is, nowadays small companies are gaining more importance. In Spain, according to Central Business Directory (DIRCE) [14], most companies are categorized as Small and Medium Enterprises (SMEs). In January of 2007, 99,81% of businesses, representing three million enterprises were small or medium. This statistic shows the importance that SMEs have in microeconomics (see Table 1).

Due to previous issues, a growing number of organizations are focusing on Service Level Manage-ment (SLM) process to determinate the level of IT Services that is needed to support the services offered. SLM provides an approach combining process management and industry best practices to ensure that the required and cost justifiable service quality is maintained and gradually improved [5]. As a result, SLM becomes a key concern nowadays.

This work addresses SLM process, from the point of view of small settings (include SMEs). Section 2 shows the importance of Service Level Management for IT Services. Section 3 and 4 describes the Systematic Review Method applied in this research work. Section 5 shows the results obtained. Finally, section 6 establishes a brief summary.

II. Importance of Service Level Management for IT Services

SLM is a vital process for every IT service provider organization in that it is responsible for agreeing and documenting service level targets and responsibilities within Service Level Agreements (SLAs) and Service Level Requirements (SLRs), for every activity within IT [6].

Moreover one of the important processes to regulate the qualities and to decrease the cost of IT ser-vices is the Service Level Management [15]. Also the ITSM models, standards and proposals give high importance to Service Level Management in the IT Service Management context.

The main factors to carry out this research focused in a systematic review for SLM from the point of view of small settings are:

• The growing current trend to acquire Technology and IT Services derivate of this acquisition by organizations [16].

• The importance of IT Service Management in small settings.

• The absence of models that help to implement the Service Level Management process in the con-text of the IT Service Management for Small Settings.

The statistics compiled by the National Statistical Institute (INE) and the Central Business Directory [8], show that small companies represent the highest percentage. The data are linked to factors such as income and sectorial concentration of such companies. The INE and DIRCE analyze their situation within the European Union and their relationship with the employees they recruit.

Table 1 summarizes the study for Spanish companies based on the employee stratum and total per-centage [8]. The interest in showing this study is due to the current importance that small companies have.

Micro-enterprise	Small	Medium	Large	Total	SMEs
3,137.46	169.60	23.52	6.07	3,336.66	3,330.58
94,03%	5,08%	0,70%	0,18%	100%	99,818%

Table 1. Spanish Companies (employee's stratum and total percentage).

Systematic review gives a summary of the state of the art for this specific topic. In this case for IT Ser-vices Management in small settings. In addition systematic review identifies the existing gap in some topics related with SLM in SMEs. This results can help users who are working with SLM or can help to know current initiatives in this domain.

III. Description of Systematic Review Method

3.1 Systematic Review Background

Integration of research results was introduced for the first time in twenty century. In 1904, Pearson calculated the average of correlations between the typhoid fever inoculation and morality. Then, sys-tematic review began to be formalized and at the end of the 80's systematic review achieves legiti-macy as a field of research [10]. Later, Kitchenham [11] evolutes the idea of Evidence-Based Software Engineering and proposes a guideline for systematic reviews that is appropriate for software engineer-ing researchers.

3.2 What is a Systematic Review

Systematic Review (SR) is used to refer to a specific methodology of research, developed in order to gather and evaluate the available evidence pertaining to a focused topic [10]. This is the process of summarize all existing information about a phenomena in thorough and empirical way. At the end, systematic review draws a general conclusion from individual studies on any phenomena.A systematic type of review follows a very well defined and strict sequence of methodological steps. A systematic review begins when researchers are confident that it is necessary to carry it out. It aims to integrate empirical research in order to create generalizations. In this regard, defined assessment objectives, reference source, data extraction method are some of the aspects contained in the proto-col used for this systematic review [10].

3.3 Protocol Description

Biolchini et al [10] have drawn up a proposal for how to conduct a systematic review focused on Soft-ware Engineering adapting it from other study area such as medicine. Hence, for this work, the protocol proposed is applied to the "Service Level Management for IT Ser-vices in small settings: a Systematic Review".

IV. Prototype Development

Next, the prototype development used for the systematic review of the subject is presented: Service Level management for IT Services in small settings.

4.1 Question Formulation

The systematic review objective should be clearly established in order to formalize the question:

4.1.1 *Question Focus*

The systematic review is carried out to identify initiatives and experience reports on Service Level Management for IT Services in small settings.

4.1.2 Question Quality and Amplitude

This section aims at defining the syntax of the research question (the context in which the review is applied and the question the study must answer) and its semantic specificity (or question range) de-scribed by the remaining items of this section - intervention, effect, outcome mesasure, population and application. Next, each of them are described [10] specifically for Service Level Management for IT Services in small settings.

• Problem: Service Level Management (SLM) is a vital process for every IT service provider organi-zation in that it is responsible for agreeing and documenting service level targets and responsibili-ties within SLAs and SLRs, for every activity within IT. SLM implementation is needed to ensure that an agreed level of IT service is provided for all current IT services, and that future services are delivered to agreed achievable targets [5].

• Question: What initiatives have been carried out to evaluate processes for Service Level Mana-gement in IT service context?

• Intervention: Service Level Management for IT Services in small settings.

• Effect: Service Level Management initiatives and proposals for IT services in small settings.

• Outcome measure: Number of identified initiatives.

• Population: Publications related to Service Level Management, IT Services and small settings

• Application: Organizations that use IT services and those who provide them.

• Experimental Design: None experimental design will be performed.

4.2 Source Selection

The objective of this section is to select the sources where the primary studies will be executed [10].
To perform the selection the author of the systematic review protocol proposes to address the follow-ing issues:

4.2.1 Source Selection Criteria Definition

• Use search mechanism with keywords and sites suggested by experts.

• Use papers recommended by other experts.

• Use papers available on the website.

4.2.2 Studies Language

• English.

4.2.3 Source Identification

Sources Search. The identification of sources has been based on the criterion of experts in our re-search area. These sources include journals as: European Journal of Operational Research, Informa-tion and Software Technology, Software: Practice and Experience, Software Process: Improvement and Practice, IEEE Software, Software Technology and Engineering Practice, Computer and research workshops & technical reports of Software Engineering Institute – SEI, among others.

Search Strings. Keywords from the word set defined in the question were extracted. Combining these keywords with the logical operators "AND" and "OR", two search strings were obtained (see Table 2). These search strings have been adapted for each web browser of the sources.

	Search String
1	itsm or slm and sla and ((itil or asl or 20000 or 15000 or cmmi-svc or mof or itscmm) and (small and (company or organization or enterprise or setting)))
2	'it service management' and 'service level management' and (small and (company or or-ganization or enterprise or setting))

Table 2. Search strings

Source List. These sources have been selected taking into account the defined source search method (see Table 3).

#	Source
1	ACM Digital Library
2	IEEE Computer Science Digital Library
3	Springer Link
4	Science@Direct
5	Software Engineering Institute

Table 3. Search strings

4.2.4 Source Selection After Assestment

First, it was evaluated if the sources fit all defined criteria. Initially, the complete list is right. After applying the search string to all sources, it was found that some items were common in the IEEE Com-puter Science Digital Library and ACM sources.

4.2.5 Reference Checking

Three researchers from the Research Group of Software Process Improvement for Spain and Latin American Region evaluated the sources list obtained from the previous section and determined, at first instance, all references as approved.

4.3 Studies Selection

In this systematic review an iterative and incremental procedure is used for studies selection: a) Iterative, to group all activities that could be repeated during the procedure, and b) Incremental, because the studies are approached and recorded one by one until obtaining the systematic review results [12]. This iterative and incremental procedure is used due to its functionality in other systematic reviews. This section describes the process and criteria for studies selection and evaluation.

4.3.1 Studies Definition

The studies inclusion (IC) and exclusion criteria (EC) definitions [11] are as follows:

Acronym	Criteria Description
IC1	Include papers whose title is related to Service Level
	Management and IT Services and small settings
IC2	Include papers that contains keywords that match with
	those define in the search string
IC3	Include papers whose abstract is related to the topic
	considered
IC4	Include papers after partial or total reading
EC1	Exclude those papers that do not match with the previ-
	ous inclusion criteria
EC2	Exclude all duplicate papers

Table 4. Studies inclusion and exclusion criteria definition

Studies Types Definition. Initially all studies related to Service Level Management will be taken into account. However, the greatest interest will focus on studies that show results on Service Level Man-agement for IT services in small settings.

Procedures for studies selection. With regards to the selection criteria, the title was initially the main criterion; nevertheless, in some cases it did not provide enough information, thereby reading the summary of each of them was necessary and in some cases a review of the full text was required.

4.3.2 Selection Execution

- Initial Studies Selection. At first a search execution was conducted to verify the parame-ters used by each engine and adapt search string to them. Table 5 shows in the column "Found" the obtained value.
- Study Quality Evaluation. To determine the quality of the study, some participants of the research group, applying IC and EC, obtained the primary studies (see Table 5).

Sources	Search date	Found	Primary studies
IEEE	05/11/09	59	11
ACM	05/11/09	12	3
Springer	05/12/09	59	12
Science@Direct	05/13/09	42	3
SEI	05/14/09	10	3
Total		182	31

Next, a quality study is evaluated to obtain the assessment results that permit us to quantify those studies that effectively support the stated objectives. The previous information constitutes the study basis for following the systematic review process, and checking the quality of the study.

4.4 Information Extraction

This section begins once primary studies are selected. Then, in this section, extraction criteria and result are described

---

4.4.1 Information Inclusion (ICinf) and Exclusion (ECinf) Criteria Definition

Acronym	Criteria Description
IC1inf	Collect Information about the organization's trend respect to service level management.
IC2inf	Classify processes followed by companies for IT service management.
IC3inf	Identify proposed methodologies, methods and procedures in studies for IT service management
EC1inf	Exclusion the information that is not related to the inclusion criteria defined above.

Table 6. Information Inclusion and Exclusion Criteria Definition

4.4.2 Data Extraction Forms

To analyze data and information submitted in selected studies, relevant remarks of the main studies ideas were made and recorded in a document with a sequence number identification that matches with the sequential paper number given when it was stored a primary study.

4.4.3 Extraction Execution

Objective Results Extraction: A complete and detailed reading from these studies allowed us to organize and classify then for a later analysis. With an unbiased evaluation of the information, identified and classified studies records were generated in a structured table containing the following rows: Consecutive Study (sequential paper number), Study methodology (remarks of the main ideas con-cerned with the methodology), and Study outcome (data and information of the conclusion presented in each study).

Subjective Result Extraction: The following rows where added to the previous table: Data about Authors (full names and available contact information in the studies) and Additional Notes (a specific field to store general information related to subject covered in the study).

4.4.4 Resolution of divergences between reviewers

In the development procedure for the extraction of the information contained in the selected primary studies, different perceptions among authors of the studies were presented. However, none of them is considered as an important divergence, but rather, the findings were complemented to obtain a com-prehensive analysis of the paper.

V. Result Summary

After the systematic review execution, the results must be summarized and analyzed using the statistical methods defined during the planning phase. This section presents a summary of the data resul-ting from the selected studies. This summary is obtained from statistical calculus.

5.1 Studies Trends

In order to know organization trend respect to Service Level Management (SLM), studies related to any aspect of SLM were classified, taking into account that "SLM" term refers to both Service Level Agreement (SLA) and Service Level Operation (SLO) terms.

Figure 1 shows two types of trends. 1) Between 2002 and 2006, there is a polynomial trend of order 3 because data fluctuate along the graphic. And, B) from 2006 to 2008 data have a linear trend because the studies are increasing at a constant rate. The trend shows from year 2006 the increasing interest related to Service Level Management.
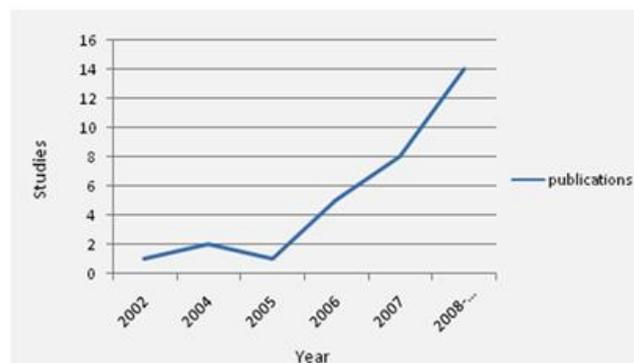

Fig. 1. Studies Trend

5.2 Studies Classification

During the protocol development, and using the studies selection's methodology and information analysis found in each study, it was possible to determine that studies could be classified into four items. Those studies covering:

A)   topics related only to ITSM and SLM.
B)   topics related only to ITSM and small settings.
C)   a relationship of three topics (ITSM and SLM and small settings), and
D)   other studies that have no relationship with these issues (ITSM and SLM and small settings).

Figure 2 shows the studies percentage for each item according to the previous classification.
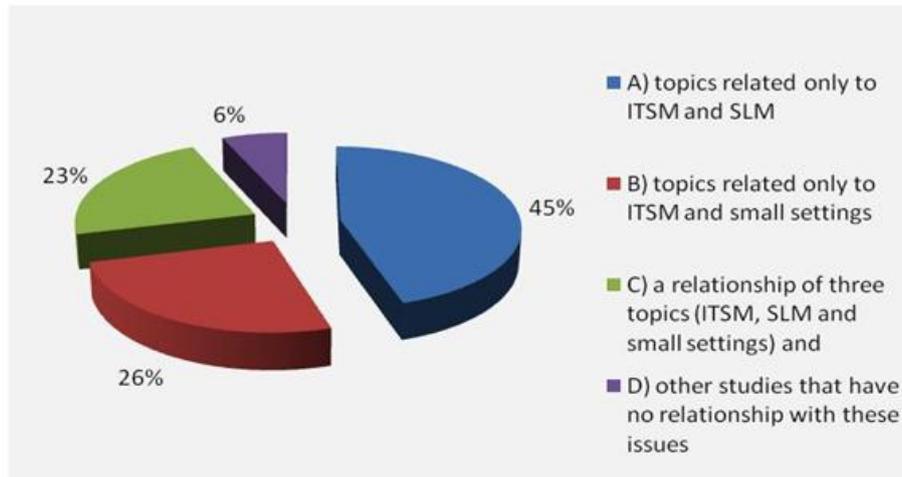
Fig. 2. Studies Classification

Figure 2 shows that the 45% of the primary studies (see Table 5) are related to ITSM and SLM what confirms the trend shown in Figure 1. The 26% shows information related to ITSM and small settings. However, it is necessary to highlight that only 23% is related to item C) that grouped the three topics (ITSM, SLM and small settings). Finally a 6% has been eliminated by the exclusion criteria EC1inf.

5.3 Analysis of those studies covering the relationship of three topics (ITSM, SLM and small settings)

Figure 3 shows the results of relationship related to topics (ITSM, SLM and small settings). In the analysis, it is noted that 23% of the papers comprise three aspects (basis of the ongoing systematic re-view). From here all analyses are referred to this 23% (item C).

5.3.1 Analysis by country

The source of 23% of the papers is shown in Figure 3. United States of America is one of the main countries involved in the study of ITSM, SLM and small settings, with 29%. The remaining studies are divided in the countries South Korea, Sweden, French, Canada and Germany with 14% respectively.
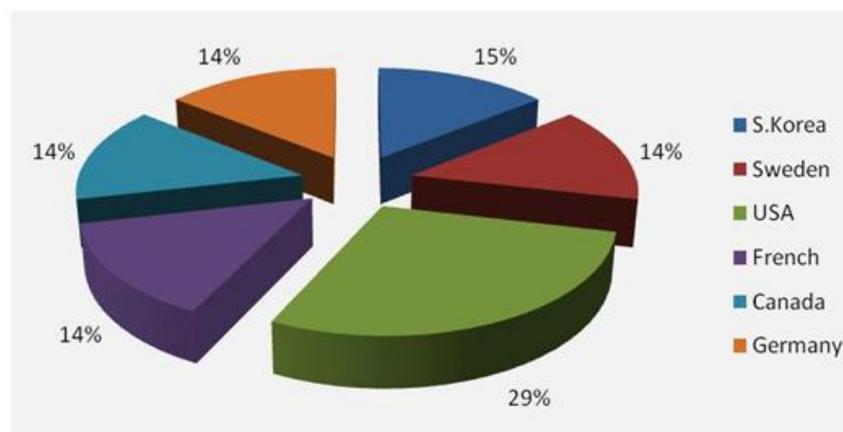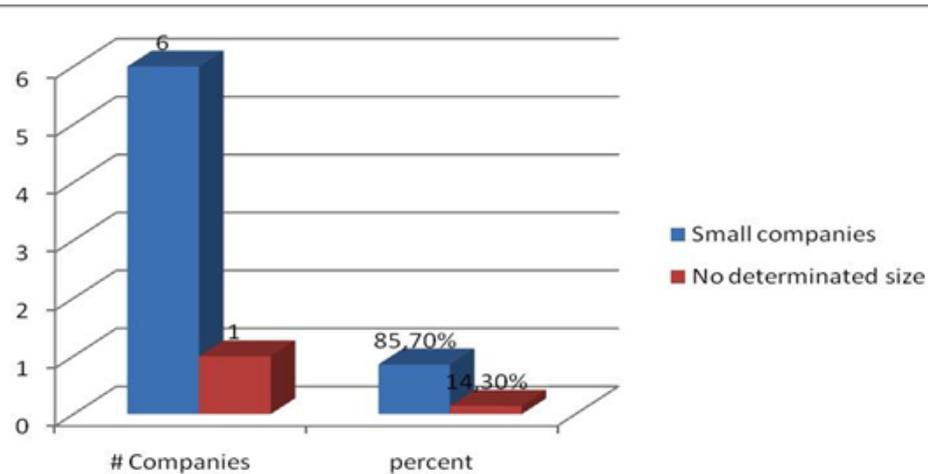

Fig. 3. Studies Classified by country

### 5.3.2 Analysis by company size

Figure 4 shows information about companies' size. Due to most of the studies are short of information about companies, Figure 4 has been made taking into account two criterions: 1) the application of studies in the companies' size, 2) the studies did not mention the companies' size. Hence, according to Figure 4, most of the companies that support their research are small companies, 85,7%. Remaining 14,3% companies are not mentioned.

Fig. 4. Studies by companies size

5.3.3 Analysis by models

With respect to item C only the 78% have used ITIL. COBIT and ISO 20000.
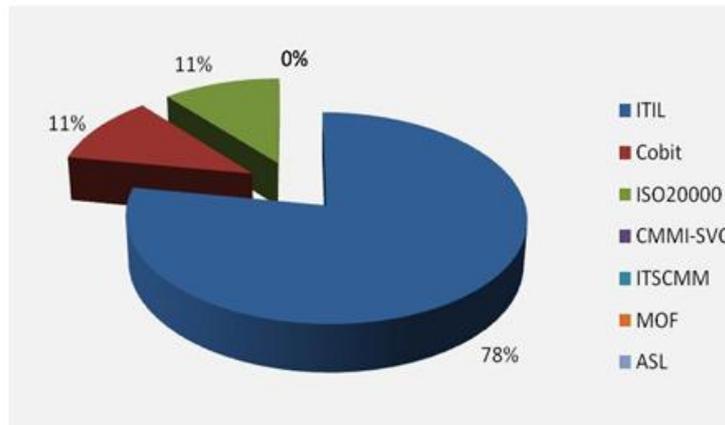
Fig. 5. Studies Classified by models

VI. Conclusions

This work shows the results for Systematic Review of the studies related to Service Level Management in small settings. It was obtained using the protocol proposed by Biolchini et al [10] The obtained results show the status of the art for "Service Level Management in small settings". We can see most of the works have been performed in year 2008. According to the statistics we find from year 2005 the works on Service Level Management are increasing significantly. This trend confirms the interest over SLM process showed by Gartner and CMMI-SVC reports.

Other relevant data showed in this work is that 45 % of studies papers deal with IT service management in terms of SLM (include SLA and SLO). The 26% of the studies is related to small setting (in- clude SMEs). Moreover, 23 % of studies are related to SLM and small settings. The studies show that ITIL, COBIT, and ISO2000 are the most important models in a Service Level management context. These results can help users who are working with SLM or can help to know current initiatives in this domain.

Acknowledgments

Appendix A: List of primary studies in the systematic review

Next are presented the selected primary studies in the development of this systematic review.

References

[1]. NeilMcBride, "Exploring service issues within the IT organization: Four mini-case studies", International Journal of Information Management, 2009

[2]. Stefan Thanheiser, Lei Liu, HartmutSchmeck: "Sim-SOA: an approach for agent-based simulation and design-time assessment of SOC-based IT systems", Proceedings of the 2009 ACM Symposium on Applied Computing (SAC), Honolulu, Hawaii, USA, March 9-12, 2009

[3]. CMMI Product Team, "CMMI® for Services, Version 1.2", Technical Report CMU/SEI-2009-TR-001, Software Engineering Institute, USA, March, 2009

[4]. Mira Kajko-Mattsson and Christos Makridis, "Evaluating SLA Management Process Model within Four Companies", The Third International Conference on Software Enginee-ring Advances, Sliema, Malta, 2008

[5]. Thomas Schaaf, Michael Brenner, "On Tool Support for Service Level Management: From Requirements to Sy-stem Specifications", Proceedings of BDIM 2008, 3rd IEEE/IFIP International Workshop on Business-Driven IT Management, , Salvador, Brazil. IEEE 2008

[6]. GenadyGrabarnik, Heiko Ludwig, Larisa Shwartz, "Dynamic Management of Outsourced Service Processes' QoS in a Service Provider – Service Supplier Environ-ment", International Workshop on Business-Driven IT Management, BDIM 2008: Salvador, Brazil, 2008

[7]. Adrian Paschke, Martin Bichler, "Knowledge represen-tation concepts for automated SLA management", The Computing Research Repository (CoRR), Decision Sup-port Systems 46 (2008) 187–205, 2008

[8]. Jung-Oh Park, Sang-Geun Kim, Byeong-Hun Choi, Moon-Seog Jun, "The study on the maturity measurement method of security management for ITSM", International Conference on Convergence and Hybrid Information Technology, Gyeongbuk, S. Korea, 2008

[9]. Rajeev Gupta, K Hima Prasad, MukeshMohania, "Automating ITSM Incident Management Process", Inter-national Conference on Automonic Computing, Chicago, IL, USA , 2008.

[10]. HainingWang Shouqian Sun Yanan Huang Shiwei Cheng, "An ITIL-Based IT Service Management Model for Garment Enterprises", International Conference on Infor-mation Management, Innovation Management and Indus-trial Engineering, 2008. ICIII '08, Taipei, Taiwan, 2008

[11]. Nabiollahi, Akbar bin Sahibuddin, Shamsul , "Consi-dering service strategy in ITIL V3 as a framework for IT Governance, International Symposium on Information Technology", ITSim 2008, 26-28 Aug. Kuala Lumpur, Malaysia, 2008

[12]. Jin, K. Ray, P. "Business-Oriented Development Methodology for IT Service Management", Proceedings of the 41st Annual Hawaii International Conference on Sy-stem Sciences, Hawaii, USA, 2008

[13]. Philip Bianco, Grace A. Lewis, Paulo Merson, "Service Level Agreements in Service-Oriented Architecture Envi-ronments", Technical Note CMU/SEI-2008-TN-021, Soft-ware Engineering Institute, 2008

[14]. Michael Brenner, Gabi DreoRodosek, et al, "Provisio-ning: Challenges, Process Alignment and Tool Support". Handbook of Network and System Administration, 2008, Pages 855-904

[15]. Larisa Shwartz, Naga Ayachitula et al, IT Service Provider's Multi-Customer and Multi-Tenant Environments, The 9th IEEE International Conference on E-Commerce Technology and The 4th IEEE International Conference on Enterprise Computing, E-Commerce and E-Services(CEC-EEE 2007), Tokyo, Japan,2007

[16]. Christian Braun, Robert Winter, "Integration of IT service management into enterprise architecture", Sympo-sium on Applied Computing archive, Proceedings of the 2007 ACM symposium on Applied computing table of contents, Seoul, Korea, 2007

[17]. International Conference on Wireless Com-munications, Networking and Mobile Computing, WiCom 2007, Shanghai, China, 2007

[18]. Larisa Shwartz, Naga Ayachitula, Melissa Buco, MaheswaranSurendra, Christopher Ward, "Service Pro-vider Considerations for IT Service Management", 10th IFIP/IEEE International Symposium on Integrated Network Management, Munich, Germany, 21-25 May 2007

[19]. Rob Addy, "Effective IT Service Management", ISBN 978-3-540-73197-9 Springer Berlin Heidelberg New York, 2007

[20]. Halina Kaminski, Mark Perry, "Employing Intelligent Agents to Automate SLA Creation", Whitestein Series in Software Agent Technologies and Autonomic Computing Book Emerging Web Services Technology, 2007

[21]. Brenner M., DreoRodosek G., Hanemann A., Heger-ing H.-G., König R. "Service Provisioning: Challenges, Process Alignment and Tool Support". Handbook of Net-work and System Administration, J. Bergstra, M.Burgess (editors) Elsevier, 2007, ISBN 978-0-444-52198-9.

[22]. Hao Wang Bo Yang Liang Liu Qian Ma Ke Wei Sun Ying Chen , "Knowledge Enhanced IT Service Man-agement", IEEE International Conference on e-Business Engineering, ICEBE 2007, Hong Kong, 2007.

[23]. Sven Graupner, Nigel Cook, Derek Coleman, TiloNitzsche, "Platform for Delivering IT Management Ser-vices", Hewlett-Packard Laboratories, 1501 Page Mill Road, Palo Alto, CA 94304, USA, 2006

[24]. Software Engineering Institute, "Improving Processes in Small Settings (IPSS) A White Paper", The International Process Research Consortium (IPRC) Pittsburgh, PA 15213, 2006

[25]. Michael Brenner , "Classifying ITIL Processes: A Taxonomy under Tool Support Aspects", IEEE/IFIP Inter-national Workshop on Business-Driven IT Management (BDIM 2006) Vancouver, Canada, April 7, 2006

[26]. Rodrigo Bonfá Drago, Rodolfo da Silva Villaça, "A Proposed Web Tool for IT Environment Service Manage-ment", Proceedings of the Advanced International Confer-ence on Telecommunications and International Confer-ence on Internet and Web Applications and Services (AICT/ICIW 2006), Guadeloupe, French Caribbean, 2006

[27]. AkhilSahai and Sven Graupner, "Enterprise Man-agement and Web Services,Web Services in the Enter-prise", Springer US ISBN 978-0-387-23374-1 (Print) 978-0-387-27597-0 (Online), 2005

[28]. Thorsten Anders, "Development of a generic IT ser-vice catalog as pre-arrangement for Service Level Agree-ments", 10th IEEE Conference on Emerging Technologies and Factory Automation, 2005. ETFA, Catania, Italy, 2005.

[29]. Jos J.M. Trienekens, Jacques J. Bouman, Mark van der Zwan, "Specification of Service Level Agreements: Problems", Principles and Practices, Software Quality Journal, Volume 12, Number 1 / March, 2004, Springer Netherlands.

[30]. [30] Claudio Bartolini and Mathias Sallé, "Business Driven Prioritization of Service Incidents", 15th IFIP/IEEE Interna-tional Workshop on Distributed Systems: Operations and Management, DSOM 2004, Davis, CA, USA, DSOM 2004, LNCS 3278, pp. 64–75, 2004.

[31]. V.P. Wade, "Service management and the telecom-munications information networking", Computer Communi-cations 22 (1999) 1633–1637, Elsevier Science B.V. Dub-lin, Ireland.

Literature

[32]. National Academy of Engineering. The impact of Academic Research on Industrial Performance. The National Aca-demic Press, Washington, DC, 2003.

[33]. [2] Eileen Forrester, CMMI for Service (CMMI-SVC) Overview, Software Engineering Institute, Carnegie Mellon Univer-sity, USA , 2006

[34]. Lynch, C. G. "Most Companies Adopting ITIL® Practices," CIO Magazine, March 1, 2006.

[35]. Stuart, G., Ronald, D., Jim, J.Q, Sue C, Information Technology Service Management-An Emerging Area for Academic Research and Pedagogical Development, SIGMIS-CPR'07, St.Louis, Missouri, USA, 2007

[36]. Office of Government Commerce, ITIL: Service Design, The Stationary Office. 2007

[37]. Office of Government Commerce,The official introduction to the ITIL service lifecycle: the official introduction to the ITIL service lifecycle, The Stationary Office, 2007

[38]. Hochstein, A., Zarnekow, R., Brenner, W.: ITIL as Common Practice Reference Model for IT Service Management – Formal assessment and implications for practice, in: Proceedings of the 2005 IEEE International Conference on E- Tech-nology, E-Commerce and E-Service, Hong Kong, 2005.

[39]. Directorio Central de Empresa DIRCE, Empresasespañolas (estrato de asalariados y porcentajedel total) DIRCE 2007. http://www.ine.es/inebase/cgi/axi

[40]. http://www.interpromusa.com/downloads/Book%20Content/Introduction%20to%20ITIL.pdf, February 4, 2009

[41]. BiolchiniJ.,Gomes M.P., Cruz N.A., Horta T.G., "Systematic Review in Software Engineering", RT ES679/05, 2005

[42]. Kitchenham, B. A., Dyba, T. and Jorgensen, M., Evidence-based Software Engineering, 26th International Conference on Software Engineering (ICSE 2004), Scotland, 2004.

[43]. Pino J.F., G.F., Piattini M., *Software process improvement in samll and medium software enterprises: a systematicreview.* Softwaer Quality Springer, 2008.**16**(2): p. 237-261.

[44]. ISO/IEC-20000-1 (2005). Information Technology- Service Management-part 1:Specification, International Standard Organization.

[45]. DIRCE, D.C.d.E. Empresasespañolas (estrato de asalariados y porcentajedel total) DIRCE 2007.

[46]. Johnston, R.B.a.R., Service Agreements- A management Guide. first ed. ITSM Library, ed. J.V.B.a.A.d. Jong. 2006: Van Haren Publishing.

[47]. AEC (2007), "La consultoríaenEspaña", Asociación Española de Empresas de Consultoría. El sector encifras 2007 engineering and software process improvement.