Network utilities are companies dealing with network infrastructure, (such as distribution of gas, water, electricity or telecommunications), and they require the development of special maintenance management capabilities in order to satisfy the needs of their customers. In this sector, maintenance management information systems are essential to ensure control, gain knowledge and improve decision-making.

The aim of this book is the study of specific characteristics of maintenance in these types of companies. We discuss existing standards and the best management practices with the scope of defining a suitable ad hoc framework for the implementation of maintenance management.

The work offers a very practical approach to the problem, defining a series of stages to follow in order to manage maintenance framework properly.

The work is divided into three major parts that cover different contents with the following intentions:

- **Part I. Introduction to Maintenance Management in Network utilities:** Reviews the basic concepts and models needed for the design, development and implementation of the framework in network utilities companies.
- **Part II. Processes and Tools to Manage Maintenance in Network Utilities:** Develops the basic pillars of the maintenance management framework for these companies, providing the reader with a consistent background in practical modeling tools and systems for network maintenance management.
- **Part III. Management Framework Evaluation:** Offers a practical view of the network utility maintenance management evaluation process, focusing on the reliability concept and maturity models. Probably the most relevant aspect of this part of the book is the definition of a maturity model for maintenance management and, a performability evaluation model to measure the maintenance contribution from different points of views that can be found in the relevant literature. Through different case studies, this work provides a detailed description about framework implementation and illustrates the experiences in real company situations.
This book tries to show that maintenance management optimization in network utilities is a relevant issue. Due to their huge infrastructure and organization, maintenance management needs to be based on proper processes, decision-making tools and systems (technologies) in order to achieve suitable levels of maintenance organization and service.

In order to do so, we have characterized suitable processes, tools and systems, evaluating their application to service provider companies, but in order to obtain a comprehensive framework covering all maintenance points of view: organizational, functionality, economic, quality, safety and improvement.

Searching this management integration we have established a processes framework, where the maintenance functions have been characterized in order to fulfill the mission and objectives of the department, but in line with the overall objectives of the organization.

At the same time we have explored current issues related to systems integration and connection and how they relate to the sector of activity of the network utilities. We pay special attention to the support provided to management activities at different levels and to the standards for interoperability.

Developments in information systems and processes have followed parallel paths in industrial companies and in IT companies. The present framework seeks convergence between functions and systems in order to optimize maintenance by properly managing its knowledge. This convergence is justified mainly through the implementation of emerging e-maintenance strategies, which due to the spread of the Internet and modern communications, allow remote control, which was previously impossible for infrastructures of such dimensions.

Furthermore, another issue of vital importance in maintenance is the assessment of its real contribution to the organization, giving maintenance tasks the responsibility and the importance corresponding to their achievements.

The assessment of maintenance in network utilities companies is presented using different levels of maturity and excellence. We pursue and increase in the collective intelligence of the maintenance organization by expanding, improving and disseminating knowledge in a standardized manner and with the proper information technology support.

We seek constant maintenance innovation developing and valuing the knowledge of the maintenance organization using use criteria of intellectual capital for this continuous improvement.

In summary, the framework for network utilities has been developed with the aims of:

- Unifying concepts and terminology to facilitate communication and to guide sustainable development of maintenance.
- Defining the common bases of knowledge and the appropriate technologies for optimization.
- Facilitating staff motivation, consensus in decision-making and the involvement of management with an integrative approach.
• Allowing maintenance management to be auditable and comparable with those of other organizations or reference standards from different fields and different levels of detail.
• Identifying improvements and risks arising from its application by the performance, achievement of objectives and degree of standardization.
• Quantifying in terms of cost the maintenance implications in different fields.
• Ensuring service quality from customers, business and society perspectives.

The conclusion of the work supports the proposal of a reference framework, which we do believe is useful as a recommendation for the distribution networks sector. This framework consists of a set of standardized processes and proven technologies and systems, integrated for continuous improvement of maintenance activities. The maturity level of the framework can be measured as well as the intellectual capital developed by the organization in accordance with its contribution in performability and with the excellence in management.

This framework will ensure suitable life cycle of resources and customers’ loyalty in network utilities companies, through a sustainable and stable evolution which progressively reduces uncertainty and reactivity through knowledge generation and dissemination.

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