Chapter III

On the Maturity of Software Maintenance and Other IT Services

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ABSTRACT

In this chapter, we examine the differences between software maintenance and software development from a service point of view, and the consequences thereof for the maturity of software maintenance organizations. We argue that software maintenance can be seen as providing a service, whereas software development is primarily concerned with the development of products. Differences between products and services affect the way in which customers assess their respective quality. In particular, service quality is assessed in two dimensions: the technical quality — what the result of the service is — and the functional quality — how the service is delivered. Consequently, customers will judge the quality of software maintenance differently from that of software development. This in turn means that to deliver high quality results in software maintenance, both the functional quality and the technical quality dimension are important.

INTRODUCTION

In order to provide high-quality software maintenance, different and additional processes are needed than provided by a high-quality software development organization. These processes are derived from the gap model of service quality. This model of service quality explains the difference between expected quality and perceived quality, which in turn, determine customer satisfaction.

If we look at software maintenance and software development from a service perspective, we see that software maintenance is all about sustaining the software system, that is, sustaining the service; whereas software development is about building
products. In this chapter, we argue that the processes for high maturity software maintenance are different than those needed for high maturity software development. Consequently, a maturity model for software maintenance organizations needs to be different from a maturity model for software development organizations. This chapter describes the IT Service Capability Maturity Model (CMMI), which aims to capture the processes needed for high maturity Information Technology (IT) service provision, including software maintenance.

SOFTWARE MAINTENANCE FROM A SERVICE PERSPECTIVE

In this section we discuss the differences between products and services in general. We translate the gap model to the software maintenance domain to see what processes can be used to minimize the gap between expected service quality and perceived quality in a software maintenance environment.

Service versus Product

A wide range of definitions exists in the marketing literature of what a service actually entails (Grönroos, 1990). Usually, a service is defined as an essentially intangible set of benefits or activities that are sold by one party to another. The main differences between products and services are (Zeithaml, 1996):

- **Intangibility.** This is considered to be the most basic difference between products and services. Services — being benefits or activities — cannot be seen, felt, tasted, or touched, like products can. Consequently:
  - services cannot be inventoried,
  - services cannot be patented,
  - services cannot be readily displayed or communicated, and
  - pricing of a service is more difficult.

- **Heterogeneity.** Because services are created by activities, and activities are performed by humans, services tend to be more heterogeneous than products. Consequently:
  - service delivery and customer satisfaction depend on employee actions,
  - service quality depends on factors that are difficult to control, such as the ability of the customer to articulate his or her needs, the ability and willingness of personnel to satisfy those needs, the presence or absence of other customers, and the level of demand for the service, and
  - these complicating factors make it hard to know whether the service was delivered according to plan or specifications.

- **Simultaneous Production and Consumption.** Services are produced and consumed simultaneously, whereas for products, production and consumption can be separated. For example, a car can be produced first, sold a few months later, and then be consumed over a period of several years. For services, on the other hand, the
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