Chapter 10
Information Technology Product Quality, Impact on E-Governance, Measurement, and Evaluation

Jiri Vanicek
Czech University of Life Science, Czech Republic

Ivan Vrana
Czech University of Life Science, Czech Republic

Zdeněk Struska
Czech University of Life Sciences, Czech Republic

ABSTRACT

The chapter deals with the problems of information technologies' quality aspects and their importance for the state and public administration, e-governance, and e-democracy. The concept of quality is defined, and it is demonstrated that for quality evaluation, the clarification of needs and specification of exact requirements represents a key problem. The chapter focuses on general quality management and specifically on quality of ICT-solutions. The ISO/IEC software product quality and data quality is thereafter briefly presented. The principle of quality evaluation based on the quality decomposition into several characteristics is also described along with the principles of measurement theory. Finally, this is supplemented by selected approaches for expert rating of trends for ICT-solutions having a direct impact on long-term quality prediction.

INTRODUCTION

The main objective of this chapter is to point out the importance of the quality of Information and Communication Technologies (ICT) intended for applications in state and public administration. A well-balanced choice between the required quality and the costs is usually a fundamental problem of institutions responsible for their selection and purchase. Today it is not feasible for public institutions to develop ICT applications using their own human resources. They do not have sufficiently qualified personnel for such specialised work

available. To employ such highly qualified staff would not be effective in the long-term. Hence, public administration authorities depend on purchasing the necessary products and services on the market, or on ordering the development of a custom-made solution. The amount of money coming from public sources to accommodate these ICT demands is vast. It is thus crucial to allocate these funds efficiently and responsibly, for the credibility of state and public institutions.

To achieve the needed balance between the contribution of ICT facilities and acquisition costs, it is necessary to define the actual needs as accurately as possible, to assess how the evaluated ICT products meet these requirements, and to what extent. It actually requires evaluating the quality of these products. Only then, is it possible to compare the product quality to the anticipated acquisition costs. While the costs or expenses can be determined unambiguously, the assessment of quality is a much more difficult task. To evaluate the quality of complex intangible products such as computer software can be particularly complicated, and always somewhat disputable. The quality assessment is a complex problem for all interest groups such as product developers, acquirers including end users, or system integrators. It is a common practice in the developed countries that this quality evaluation is performed by independent third parties, who have sufficient reputation and adequate experience for such complex activities. Although considerably difficult, it is very important to ensure the utmost objectiveness and mutual comparability of the evaluation process.

There are two approaches towards quality evaluation. The first approach tries to find the exact definition of product quality and the evaluation process. It is based on separating the product requirements into individual quantifiable product characteristics called *attributes*. Numerical representation of these *indicators*, which should be achieved, is then compared to the actual value of the evaluated product attribute; the *measure*. Finding this value is based on a transparent method

called *measurement*. Then, the quality evaluation lies in a complete comparison of deviations of instantaneous values from required indicators, taking into account the relevance of individual attributes for the user. In applying such methods, it is crucial that they are performed uniformly so that the results are comparable. In this chapter, we introduce the models and methods defined in international technical standards, which are being developed by the international standardisation authorities, ISO and IEC (International Electromechanical Committee). We also present the current situation of standardisation, the expected advancements, and possible problems in this field.

The other approach towards quality evaluation is based on previous experience and on an appraisal of existing progress in the field that is on expert analysis of existing trends. We present these methods in this chapter.

BACKGROUND

The international standards for quality management of the ISO 9000 series are well known and respected in the community of developers, suppliers, acquirers, and users of all product categories. However, these standards are general, and cannot reflect specifics of individual products including software products. These standards are primarily focused on the implementation of quality management systems for product developers, producers, suppliers and service providers, but only marginally for product acquirers and end users. They obviously cannot directly apply to the development process, and have often only limited information about it. The conformance of the development process with the requirements of the ISO 9000 series provides a certain level of product quality, but it cannot assure that all product attributes fit to particular user requirements. Accordingly, it is necessary to extend the general standard of the ISO 9000 series by standards for product quality evaluation based on specifics of individual types of products.

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