Relating Software Quality Models and Process Methods to User Value

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ABSTRACT

The ultimate object of software development should be to deliver value to all stakeholders. The traditional approach to delivering this value is to ensure that the software developed is of the highest quality. A number of quality models have been proposed to specify or describe what constitutes high quality software. The ISO9126 is one such model and perhaps the most comprehensive. Similarly, there are several methods, frameworks and guidelines for ensuring software quality in either the development or use process or both. Software Quality Management and Risk Management are probably the two most popular methods employed by developers during software development and implementation to deliver quality. In this paper the authors examine whether, and to what extent, the implied value propositions of software products as portrayed by the ISO9126 quality model and the prescribed processes in Software Quality Management and Risk Management, map onto user value perceptions and experiences. An ontology of value, in the form of a value tree, is developed and used to identify and analyse the key value dimensions of the ISO9126 quality model and the Software Quality Management and Risk Management process methods. These are then mapped onto contextualised user value characterisations derived from the extant literature. Differences identified are analysed and discussed and the authors suggest approaches that could narrow the perennial gap between idealised quality product and process models and stakeholder perceptions and actualisations of software value.

Keywords: Process Methods, Quality Models, Risk Management, Stakeholder, Value

INTRODUCTION

The fundamental tension between supply-side quality paradigms and demand-side value perceptions, especially in respect of experience goods like software, could be partly attributed to the difference between Quality and Value. Experience goods cannot be fully and satisfactorily assessed or evaluated on the basis of a list of attributes or characteristics. Users evaluate experience goods through actual use – often through a brief interaction with the artefact/good or a beta version of it – in order to confirm, refute or extend apparent value claims made through

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descriptions or attribute lists. Other forms of implied value claims include the reputation of the developer organisation, which may derive from recognition and/or certification for deploying acclaimed high standards in their development processes. Whilst the supply side i.e. software developers focus on the quality of their technologies, processes and products, the demand side comprising of the owners and end-users almost exclusively aim at the ultimate value derived from deploying the software in their particular functional domain. To the extent that quality and value, in general, are neither synonymous nor equivalent, it is reasonable to question and hence investigate whether idealised models of product and process quality are necessary and especially sufficient to deliver value to sponsors (owners) and end users. While the objectives and processes deployed by developers principally focus on creating and enhancing quality, the demand side tend to be only interested in value. The developer’s objective of achieving high quality may not necessarily deliver the owner’s or user’s target value. Hence quality may be necessary but often not sufficient to deliver value. It has even been suggested that, sometimes, quality destroys value (Favaro, 1996). Barry Boehm’s (2003) value-based approach to software development describes conventional software development approaches as ‘value free’, implying that such approaches may not share a common purpose with the owners and users of the end product. The gap in value perceptions and focus between developers on the one hand and users on the other hand has been acknowledged by various researchers (In et al., 2001, Boehm, 2003; Madachy, 2005). An even wider problem is the lack of consensus on how to evaluate information technologies or systems, which may not be unconnected with the diverse perspectives on value. Further more Berghout & Remenyi (2005) comment that ‘the notion of value and benefits ... are churned over again and again with virtually no progress to show for this debate’.

Our object in this paper is to investigate whether and to what extent, the implied value propositions embedded in software quality product and process models align with user value perceptions and experiences. There are several software process and product quality models and methods but we confine this study to the ISO9126 quality model, which is perhaps the most comprehensive of contemporary quality models. Similarly, we consider Software Quality Management and Risk Management as two of the most versatile and widely accepted quality process methods. The rest of the paper will proceed as follows: First we review and summarise the ontology of value, from the extant literature, into a Value Analysis Tree. Next we outline and analyse the ISO9129 software quality model and the Software Quality Management and Risk Management process methods by articulating their objectives, key characteristics and processes and identifying their implicit and explicit value foci and criteria for success. We then review and identify the key characterisations of user value from the extant literature, and compare this with the implied value foci of the ISO 9126 quality model and software quality management and software risk management processes. The differences identified, should help explain some of the difficulties associated with what is commonly called ‘the software crisis’. We conclude the paper by proposing ways of bridging the identified gaps between supply side notions of value exhibited in the ISO9126 quality model and the Software Quality Management and Risk Management quality processes on the one hand and user perceptions of software value on the other.

CONCEPTS AND THEORIES OF VALUE

The term ‘value’ is often characterised as both complex and multi-dimensional. Boztepe (2007) observes that the meaning of value “oscillates between concepts as distant as economic return and moral values” and Bowman and Ambrosini (2010) argue that “value means different things to different stakeholders” of the firm, especially to its customers, suppliers, employees and investors. These differences in conceptions of value may not be unconnected
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