

Foreword

Quality of experience

2—socio-economic issues

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During the recent years, we have observed a significant growth in offers, varieties, and uses of network-based services. This was, amongst others, enabled by a growing multitude of access networks combined with usage-friendly pricing schemes. However, the conditions for providing this access vary between, but also within, regions of this planet. As a consequence, potential users become victims of the “Digital Divide”, therefore being excluded from beneficial use of ICT services. Consequently, socio-economic-technical aspects and scenarios need to be researched in order to reduce the “Digital Divide”.

Research within ICT is still quite technology-oriented, and often neglects the important window towards the end user, who wants to “get the most out of it” when using and paying for services. In particular, in this Special Issue, we address Quality of Experience (QoE) on one side and—mostly economical—terms of use on the other side. If a user does not feel that (s)he is getting “value for money”, i.e., good-enough QoE for what (s)he is paying for, (s)he might be ready to abandon the particular service provider

and/or network operator in question. We are thus facing a quality- and economy-related type of “Digital Divide”. Obviously, quality and economy form important enablers for successful service provisioning, which require a careful investigation and evaluation of behaviors, conditions, and capabilities at the border between user and technology.

In this context, the notion and topic of QoE increasingly attracts the attention of manufacturers, operators, and researchers. It links user perception and expectations on one side and technical Quality of Service (QoS) parameters, management, pricing schemes, etc. on the other side. Such links are needed in order to balance user satisfaction and economic aspects of service provisioning. However, the notion of QoE as such is not without controversy. Technicians, used to a world of objective and clearly definable parameters, tend to fear the subjective, somehow fuzzy parts associated with end user perception. Vice versa, customer relationship and marketing departments might find themselves uncomfortable with technical parameters which might not reflect the user perception in some tense situations. Nevertheless, appearance and utility of a networked service depend on the underlying technical solutions and their performance. Furthermore, legal and pricing issues need to be addressed, which also implies resource trading and dimensioning.

The second volume of this Special Issue on Quality of Experience and Socio-Economic Issues of Network-Based Services consider six contributions devoted to socio-economic aspects, some of them in relation with QoS and QoE.

The first paper, “Application of cost models over traffic dimensioning with QoS restrictions” by Alberto E. García, Laura Rodríguez de Lope, and Klaus D. Hackbarth, considers a cost model for IP-based broadband access service based on a Total Element Long-Term Increment Cost (TELRIC) model for bitstream access service in relation with QoS restrictions.

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To this purpose, the authors apply a G/G/1 queuing model, consider different traffic classes and traffic engineering methods and study their impact on the cost. The paper concludes that the influence of the QoS restriction on the corresponding cost depends strongly on the bandwidth values required from an ISP, the applied traffic engineering method, the statistical parameters of the packet arrival stream, and the corresponding packet length.

The second paper, “An economic model for pricing tiered network services” by Qian Lv and George N. Rouskas, considers that a correctly designed and transparent “multi-tiered pricing scheme” might provide the catalyst for Internet Service innovation and penetration. The authors formulate the problem through a nonlinear programming model and develop a corresponding algorithm for calculating a set of optimal service tiers. The corresponding pricing scheme is then calculated applying game theory methods. The model allows considering different interests, either the user’s or the ISP’s, but also a combination of both. Hence, the paper provides a generic framework for the problem of multi-tiered pricing schemes in Internet and a corresponding toolset which allows developing real-life customized pricing schemes.

The third paper, “Optimal pricing strategy with compensation when QoS is not satisfied” by Bruno Tuffin, Hélène Le Cadre and Mustapha Bouhtou, treats a pricing strategy under QoS aspects considering the mean delay. The authors model the problem by an M/M/1 queuing model and consider a refund in case that the mean delay is not fulfilled to compensate for the inconveniency of the user. The objective is to find a balance between loss due to the refund and a possible benefit due to a customer increase. The paper shows that the model provides different equilibrium points in contrast to a model where refund is not considered. Additionally, the authors give hints in determining a pricing scheme in the equilibrium point which leads to the largest market share.

The fourth paper, “How to price Internet access for disloyal users under uncertainty” by Tuan Anh Trinh,

Balázs Sonkoly and Sándor Molnár considers the relation between customer loyalty against an ISP and its pricing scheme in relation to the other competing ISPs. The paper considers that the ISP does not get the full information about the pricing schemes of the other ISPs and hence considers a game theory approach to model the uncertainty. First, the authors conclude from an empirical study of the Hungarian ISP market that customer loyalty can be observed but is strongly correlated with the price difference against the other ISPs. For a systematic approach, the authors provide three loyalty models and study their impact on the difference on ISP’s prices, market share, and revenue, respectively.

The fifth paper, “From charging for Quality of Service to charging for Quality of Experience” by Peter Reichl considers economical aspects of service charging under the concept of Quality of Service (QoS) and the implication of the concept of Quality of Experience (QoX). The author provides an overview about charging schemes under QoS and the current move from the QoS concept to the QoX one. The paper resumes recent proposals for QoX charging and discusses its implementation under the concept of Next-generation Networks. The paper concludes with a brief summary and an outlook on future research directions.

The sixth and last paper, “A real options model for the transferability value of telecommunications licenses” by Loretta Mastroeni and Maurizio Naldi, considers economical aspects of licenses transfer as an option—e.g., in frequency assignment for mobile services and networks—considering that currently licenses are assigned under strong constraints and license transferability is mostly not considered. The authors claim that allowing license reselling might provide advantages and provides an additional value. They propose a method to assess the additional value of licenses transfer using the framework of real options. The paper concludes that the value of the reselling option depends on the reselling price, the market volatility and the expiry time of the option.

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