

AN INTEGRATED MODEL FOR CUSTOMER SERVICE SUPPORT: A QUEUEING ANALYSIS

Wael Jabr[†], Radha Mookerjee[†], Yong Tan[‡], Vijay Mookerjee[†]

[†]University of Texas at Dallas, [‡]University of Washington

wmj051000@utdallas.edu, radham@utdallas.edu, ytan@u.washington.edu, vijaym@utdallas.edu

1. Background

User forums are fast becoming a popular way for firms to support their software products. These forums supplement the traditional customer support tools such as help desks and online knowledge bases. Both the firm and the user derive utility from such forums. Users receive quality and timely responses through peer-to-peer support. Firms see some support requests being channeled away from the help desk thus reducing their costs of providing support through costly channels. It is therefore in the firm's interest to ensure that user forums stay resourceful and vibrant and to divert user support away from the help desk.

2. Methodology

To analyze the tradeoff between the user forum and the help desk, we model the user forum as an M/G/1 PS system and derive the delay incurred by users when arriving. The help desk is modeled as an M/M/1 queue with an infinite waiting room for which we derive the corresponding delay.

A user with an issue that requires resolution has the option of visiting the forum or the help desk. Each of these options is coupled with a disutility the user incurs due to waiting for an answer (figure 1).

Disutility in the Forum = $D(\tau_F) = d * \tau_F$

Disutility in the Help Desk = $D(\tau_H) = D * \tau_H$

The firm's objective function is to minimize the costs of its technical support which are incurred by running both the help desk and the user forum. It also aims at minimizing the delay costs incurred by users. The firm can manipulate the flow (p) of issues to the forum or the help desk by adjusting the delays.

$$\text{MinCosts}_{\mu_H} = \text{ForumDelayCost} + \text{Help_DeskDelayCost} + \text{HelpDeskOperationCosts}$$

We model two scenarios: 1) the user has the choice between the forum and the help desk and 2) once the choice is made between the forum and the help desk, the user who arrives to the forum can find her issue already posted and join the queue waiting for an answer or she initiates a new thread.

3. Findings

For both scenarios, we derive the delays in the help desk, in the initiators queue and in the joiners queue. We also derive the optimal processing rate at the help desk (μ_H) that minimizes both the firm costs and the delays.

4. Implications

The technical support manager can easily derive the optimal processing rate in the help desk that decreases the overall costs and delays in both the help desk and user forum. Given the pool of answerers in the forum, managers can strike a balance between the costly use of the help desk and the mostly free use of user forum.

