

# Adding Relations with Long Communication Lengths between the Top and $K$ Members of the Same Level in a Pyramid Organization Structure of a Complete $K$ -ary Tree

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## Abstract

This study proposes a model of adding relations with long communication lengths between the top and  $K$  ( $K = 2, 3, \dots$ ) members of the same level in a pyramid organization structure of a complete  $K$ -ary tree. When edges are added between the root and  $K$  nodes with depth  $N$  ( $N = 2, 3, \dots, H$ ) in a complete  $K$ -ary tree of height  $H$  ( $H = 2, 3, \dots$ ) where lengths of adding edges is more than 1 and less than 2 while lengths of edges of complete  $K$ -ary tree are 1, the total shortening distance which is the sum of shortening lengths of shortest paths between every pair of all nodes by adding edges is formulated. An optimal depth  $N^*$  such that the communication of information between every member in the organization becomes the most efficient is obtained by maximizing the total shortening distance.

## Keywords

Organization structure, Complete  $K$ -ary tree and Optimization modeling.

## Biography

**Kiyoshi Sawada** is a Professor in the Department of Economic Information at University of Marketing and Distribution Sciences, Kobe, Japan. He earned B.Eng., M.Eng. and Dr.Eng. degrees in Systems Engineering from Kobe University, Japan. His research interests include operations research and optimization. He is member of INFORMS.