

# Formulating Closeness Centralities on Workflow-Supported Performer-Activity Affiliation Networks

Hyunah Kim\*, Kwanghoon Pio Kim\*

\*Department of Computer Science, Kyonggi University, Suwon-si Gyeonggi-do, 16227, Republic of Korea  
hyuna2486@naver.com, kwang@kgu.ac.kr

*(Pt9)Abstract*— This paper focuses on a special type of enterprise social networks, which is called ‘workflow-supported activity-performer affiliation network,’ and particularly formulates a metric of closeness centrality to numerically analyze the degree of clerical familiarities among performers who are involved in a workflow-supported activity-performer affiliation network. A workflow model specifies enactment sequences of the associated activities and their affiliated relationships with roles, performers, invoked-applications, and relevant data. These affiliated relationships can be revived into valuable organizational knowledge supporting business intelligence as well as managerial decision-making activities. In this paper, we particularly focus on formulating the affiliated relationships between activities and performers in a workflow model to numerically measure the closeness centralities of performers as well as the closeness centralities of activities. We also devise a series of algorithms for implementing the formulated closeness centrality equations, and describe the ultimate implications of these closeness centrality formulations in workflow-supported organizations.

*Keyword*—workflow-supported affiliation network, ICN-based workflow model, organizational closeness centrality, business process intelligence



**Hyunah Kim** Dr. Kim is an adjunctive professor and a faculty member of the collaboration technology research laboratory in the department of computer science at Kyonggi University, South Korea. She received her B.S. degree in computer science from Korea Nazarene University in 2001. Also, she received her M.S. and Ph.D. degrees in computer science from Kyonggi University in 2003 and 2009, respectively. She has been on the operational committees of several domestic and international conferences including KSII, AP-IST, ICONI, and ICACT. Her research interests include workflow systems, SCORM-based e-Learning process models, BPM, BPI, ACM, workflow-supported social networks discovery and analysis, and process-aware Internet of Things.



**Kwanghoon Pio Kim** Dr. Kim is a full professor of computer science department and the founder and supervisor of the collaboration technology research laboratory at Kyonggi University, South Korea. He received B.S. degree in computer science from Kyonggi University in 1984. And he received M.S. degree in computer science from Chungang University in 1986. He also received his M.S. and Ph.D. degrees from the computer science department at University of Colorado Boulder, in 1994 and 1998, respectively. He had worked as researcher and developer at Aztek Engineering, American Educational Products Inc., and IBM in USA, as well as at Electronics and Telecommunications Research Institute (ETRI) in South Korea. In present, he is a vice-chair of the BPM Korea Forum. He has been in charge of a country-chair (Korea) and ERC vice-chair of the Workflow Management Coalition. He has also been on the editorial board of the journal of KSII, and the committee member of the several conferences and workshops. His research interests include groupware, workflow systems, BPM, adaptive case management (ACM), CSCW, collaboration theory, Grid/P2P/Cloud distributed workflow systems, process warehousing and mining, workflow-supported social networks discovery and analysis, process-aware information systems, data intensive workflows, and process-aware Internet of Things.