Ripple Effect Analysis of Government Investment for Research and Development by the Artificial Neural Networks

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Abstract : The long-term purpose of research and development (R&D) programs is to strengthen national competitiveness by developing new knowledge and technologies. Thus, it is important to determine a proper budget for government programs to maintain the vigor of R&D when the total funding is tight due to the national deficit. In this regard, a ripple effect analysis for the budgetary changes in R&D programs is necessary as well as an investigation of the current status. This study proposes a new approach using Artificial Neural Networks (ANN) for both tasks. It particularly focuses on R&D programs related to Construction and Transportation (C&T) technology in Korea. First, key factors in C&T technology are explored to draw impact indicators in three areas: economy, society, and science and technology (S&T). Simultaneously, ANN is employed to evaluate the relationship between data variables. From this process, four major components in R&D including research personnel, expenses, management, and equipment are assessed. Then the ripple effect analysis is performed to see the changes in the hypothetical future by modifying current data. Any research findings can offer an alternative strategy about R&D programs as well as a new analysis tool.