Preliminary Modeling for Technology Transfer of New Equipment Using Fuzzy ANP

李欣怡,林采瑩,陳文欽,王維民
Architecture and Urban Planning
Architecture
weiming@chu.edu.tw

Abstract

With the rapid transition of industrial structure, the product life cycle is shortening continuously. In order to compete against competitors in the fierce market, a firm has to keep developing new technology to differentiate itself from others. The sustainable development of high-tech industry in Taiwan has promoted the advance of Taiwan's socio-economic status and has led Taiwan to become an influential player in the global high-tech market. While new products are the result of new technology, new generation of equipment, with upgraded technology, is the means to manufacture these new products. For example, the advancement of technology in the semiconductor industry has shifted the wafer size from eight inches to twelve inches, and upgraded equipment is necessary to produce large-sized wafers. Nevertheless, the cost of high-tech equipment is usually high, amounted to almost 70% of investment. Therefore, the equipment must be operated and maintained carefully to generate the highest possible profit for the firm. Additionally, most equipment suppliers are located in foreign countries (such as in Japan, the USA and Europe). It is crucial to transfer equipment technology completely from foreign equipment suppliers, taking into account the differences in cultures, languages and perceptions. This paper focuses on the process of technology transfer, in which the buyer-supplier relationship, technology transfer and knowledge management must be examined. Factors that promote the process of technology transfer are reviewed through literature first, and Delphi method is applied to select the most critical factors for the buyer-supplier relationship, technology transfer and knowledge management. A network for the efficient technology transfer process is constructed, and fuzzy analytic network process (FANP) is applied to obtain experts' opinion through pairwise comparison and fuzzy set theory, to generate a

supermatrix, and to calculate the relative importance of the critical factors. The results of this study should provide guidance to high-tech industry in the technology transfer when buying equipment from suppliers.

Keyword：supplier-buyer, Technology transfer, knowledge management, fuzzy theory, ANP