ENHANCEING EXPLANATORY POWER OF DIVERSITY INDICES

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Abstract:

Herfindahl-based diversity index and cosine-based diversity index are widely applied to measure difference in organizations or alliances. However, in context of examining diversity with respect to technology (or industry), the relatedness in-between those technologies gives rise to a problem that the categories regarded in computing those indices are not naturally inter-independent. Invalidity and inaccuracy of the indices may cause failures in measurement. Therefore, we propose a methodology improvement on those diversity indices. Our approach is applicable on the basis of measuring relatedness for each pair of technologies and then accordingly establishing a dependency-free vector space in which the original oblique coordinates system is transformed into Cartesian coordinates system. Moreover, the method of measuring technology relatedness is further improved to harness information of single-occurrence additionally, other than only co-occurrence of technologies in conventional co-occurrence matrix method pioneered by Engelsman and van Raan (Engelsman & van Raan, 1991), and Teece et al. (Teece, Rumelt, Dosi, & Winter, 1994). Finally, we deliver a thorough examination of validity, specifically for content validity, convergent validity, discriminant validity, internal consistency, and criterion-related validity. The results reveal that our improved indices perform as expected in empirical analyses. Generality of application and consistency with analogue improved measures in literature are discussed, and endogeneity resulted from measurement error is highlighted as an important issue that shouldn't be ignored in relevant empirical research.

Keywords: measurement, diversity, relatedness, validity