Component-based Predictive Path Modeling and Multi-block Data Analysis

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This discussion paper will initially focus on the predictive modeling of relationships between latent variables in a multi-block data framework. We will refer to component-based methods such as Partial Least Squares Path Modeling, Generalized Structured Component Analysis as well as to some of their recent variants and other alternatives. The modeling objective of these approaches, and the related construction of individual score values, refers to specific patterns of relationships between tangible phenomena and intangibles based on conceptual models defined by the researcher.
We will also discuss the exploratory nature of these approaches when the network of relationships is not hypothesized a priori. They will be compared to other methods in the framework of Generalized Canonical Correlation Analysis that is currently undergoing interesting developments needed to cope with new challenges (e.g. big data, regularization, feature and variable selection, multidimensionality of blocks of manifest variables meant to measure a latent concept and so on) raised by the complex and "big" data structures available nowadays. The comparisons will be based on both the different statistical criteria optimized by each method and the interpretability of the corresponding results.
Finally, we will address several theoretical and methodological issues related to each step of both the modeling and the exploratory phases: from the specification of measurement and structural links to model estimation and computation of scores, from the evaluation of model quality and performance to the interpretation of results and the assessment of their practical relevance.

Key Words: Structural models, measurement models, block multidimensionality, latent variable scores