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## New developments in innovation diffusion models: theory and practice

Innovation diffusion phenomena have long attracted researchers due to their interdisciplinary nature, which allows for integrating theories and concepts from various fields, including natural sciences, mathematics, physics, statistics, social sciences, marketing, economics, and technological forecasting. The formal representation of diffusion processes has historically relied on epidemic models borrowed from biology—namely, the logistic or S-shaped equation—based on the hypothesis that innovations spread within a social system through interpersonal communication, much like diseases spread through contagion.

Today, we are witnessing numerous diffusion processes of diverse nature, significantly accelerated by unprecedented mobility patterns and communication capabilities. These range from the spread of new epidemics to the widespread adoption of technologies and products, from the rapid dissemination of news to the broad acceptance of the latest trends and technologies. As some of these processes demonstrate, large-scale, rapid diffusion requires significant efforts to control its impact on socio-economic systems and the environment and to inform effective policy decisions.

Therefore, it is especially important to illuminate these processes through timely investigation and prediction of their evolution, both in terms of speed and scale. Gaining a better understanding of their underlying—sometimes hidden—dynamics requires combining techniques and methodologies. These theories and methods stand to benefit significantly from new and current applications, supported by recent advancements in data collection technologies.

This paper discusses theoretical and methodological aspects of innovation diffusion models and recent developments in model building and statistical inference. These could provide valuable insights into various domains, including new product forecasting, marketing, consumer behavior, and the social sciences.

### Special/ Invited session

### Classification

Both methodology and application

### Keywords

innovation diffusion, statistical modeling, practical applications

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