

NORTHWESTERN INSTITUTE ON COMPLEX SYSTEMS PRESENTS

Wednesdays

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*The Role of Compatibility in Diffusion on Social Networks**

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12:00 - 1:00 PM

(Refreshments served at 11:45 AM)

Chambers Hall, 600 Foster Street, Lower Level

In many settings, competing technologies -- for example, operating systems, instant messenger systems, or document formats -- can be seen adopting a limited amount of compatibility with one another; in other words, the difficulty in using multiple technologies is balanced somewhere between the two extremes of impossibility and effortless interoperability. There are a range of reasons why this phenomenon occurs, many of which -- based on legal, social, or business considerations -- seem to defy concise mathematical models. Despite this, we show that the advantages of limited compatibility can arise in a very simple model of diffusion in social networks, thus offering a basic explanation for this phenomenon in purely strategic terms. Our approach builds on work on the diffusion of innovations in the economics literature, which seeks to model how a new technology A might spread through a social network of individuals who are currently users of technology B. We consider several ways of capturing the compatibility of A and B, focusing primarily on a model in which users can choose to adopt A, adopt B, or -- at an extra cost -- adopt both A and B. We characterize how the ability of A to spread depends on both its quality relative to B, and also this additional cost of adopting both, and find some surprising non-monotonicity properties in the dependence on these parameters: in some cases, for one technology to survive the introduction of another, the cost of adopting both technologies must be balanced within a narrow, intermediate range. We also extend the framework to the case of multiple technologies, where we find that a simple model captures the phenomenon of two firms adopting a limited "strategic alliance" to defend against a new, third technology.

*Joint work with J. Kleinberg, M. Mahdian, and T. Wexler.

NICO Coffee Hour will follow for questions, networking, and collaboration.

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