Research Note

Multinational Diffusion Models: An Alternative Framework

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Abstract

The literature on cross-national diffusion models is gaining increased importance today due to the needs of present day managers. New product sales growth in a given nation or society is affected by many factors (Rogers 1995), and of these, sociocontagion (or word of mouth) has been found to be the most important factor that characterizes the diffusion process (Bass 1969, Moore 1995). Hence, it is interesting and perhaps challenging to analyze what would happen if a new product diffuses in parallel in two neighboring but culturally different countries. Not only will we expect some interaction among them, especially if the two societies mingle with each other. There are two streams of research in cross-national diffusion. The first type focuses on exploring the differences between diffusion processes in two countries and finding out whether those differences can be attributed to social and cultural differences between the countries involved. Examples of this type of research are found in Takada and Jain (1991), Gatignon et al. (1989), Helsen et al. (1993), and Kumar et al. (1998). These studies did find some relationship between the cultural differences of the countries studied and the differences in the diffusion process. The second stream of research focuses on modeling explicitly the interaction between the diffusion processes in two countries. This interaction is typically captured through lead-lag effect (Elashibi and Helsen 1996, Kalish et al. 1995), where the sales process in the lead country (i.e., the country where the product was first introduced) is modeled to affect the sales process in the lag country (i.e., the country where the product was introduced a few years later).

Another method to study the interaction among the diffusion processes in two countries was suggested by Puttas et al. (1997), who used a “mixing model” to empirically explore the existence of such interactions. These studies basically observed that, when a new product is introduced early in one country and with a time lag in subsequent countries, the consumers in the lag countries learn about the product from the lead country adopters, resulting in a faster diffusion rate in the lag countries. Ganesh and Kumar (1996) formulated this effect as the learning effect and, subsequently, Ganesh et al. (1997) found this learning effect to be influenced by country-specific factors (cultural similarity, economic similarity, and time lag elapsed between the lead and the lag countries) and product-specific factors (continuous vs. discontinuous innovation and the presence or absence of a standardized technology). A careful analysis of the extant literature on the second stream of research would reveal that neither the learning effect model nor the mixing model can be modified to accommodate the other model. Our contribution to the literature exactly addresses this point.

In this paper, an alternative framework is proposed that has two unique features. First, the framework is flexible enough to not only account for the lead country affecting the lag countries and vice versa, but also to accommodate the simultaneous interaction among countries in explaining the diffusion processes in the countries concerned. Using multiple product categories and a variety of new product introduction situations, we empirically demonstrate the flexibility and efficiency of our proposed framework. We found strong evidence of all types of interactions, namely, lead lag, lag lead, and simultaneous, which evidence suggests that one cannot afford to omit any of the interactions. The second unique feature of our paper is the estimation procedure that we used. Because statistical estimation of a dynamic process that includes lead-lag, lag-lead, and simultaneous types of causality within a single framework is not straightforward, we suggest an iterative estimation procedure for the estimation. This new procedure not only proved to be flexible in accommodating different types of interaction, but also converged rather quickly in all of the cases that we empirically tested. Noting that the statistical properties of these estimators are not generally available, we carried out a simulation exercise that clearly revealed the efficiency of the proposed estimation procedure. After analyzing the interaction, we went further and showed that the magnitude of the cross-national influences is affected by certain country-specific and product-specific factors. The flexibility of the proposed method over the existing methods addresses this point.