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Understanding the different pre and post peak adoption drivers in the process of Mobile Social Networking diffusion

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Key Words:

Mobile Social Networking; Diffusion; Early & Late Adopters; Indirect Network Externalities; Penetration Pricing; Interaction Models

Introduction

The mobile provision of social networking services including integrated voice, pictures and music over IP lead to the success of companies such as Snapchat, Skype WhatsApp, Twitter or Spotify. Understanding the rapid international diffusion of these companies' mobile integrated services, resulting from the interplay of consumers' needs and companies' appropriate marketing mixes is of clear managerial relevance, due to the profits and market value implications of the number of customers reached, while being of great research interest, given the complex role played by the different drivers affecting users' adoption decisions for these mobile social networking services.

Given the interactive nature of social networking and the ensuing relevance of users' generated content, a member's utility from joining a social networking platform increases with the number of users, so that higher penetration levels increase the utility of new adopters and the expected utility of the potential ones, through *direct network externalities* (Katz & Shapiro, 1985, 1986). As technological change is constantly transforming and increasing the capabilities of smartphones, allowing mobile Internet access for sharing and transmitting videos, pictures music and voice, and because of the increasingly fast mobile access networks, Mobile Social Networking adoption choices are also affected by *indirect network externalities* due to the diffusion of *smartphones*, the complementary commodities required for the adoption of MSN services identified as a key driver for the adoption of mobile applications. Other likely predictors for the adoption decisions are likely to be linked to the *effective prices* of using mobile phones, a crucial driver for adoption of multimedia mobile services and the *time* spent on using them.

Methodology

This paper focuses on the analysis of these key adoption predictors in the market for MSNs. This is done through a two-stage strategy, separately estimating the effects of the *direct* and of the *indirect* network externalities on the diffusion process of MSNs across seven different countries. Positive *direct network externalities* in the diffusion of MSNs, highlighting the relevance of *herding* and of *imitation* in adoption behaviour, are captured by estimating alternative specifications of nonlinear, S-shaped, aggregate diffusion curves (Bass, Gompertz,

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Logistics). A key consequence of these nonlinearities is the qualitative changes they allow to identify in adopters' behaviour, before and after the peak of adoptions has been reached. This peak has long been identified as discriminating between early and late adopters (or majorities Rogers (2003)) and represents an obvious partition between users' attitudes towards the adoption of a new product or technology.

This paper's main research objective is to assess how these differences in adoption behaviour, between early and late adopters, interact with other exogenous predictors of MSN adoption. In more detail, the focus of the paper is on how *indirect network externalities* may play a different role in the adoption decisions, depending on whether they affect early or late adopters or, in other words, how these indirect externalities' impact, on MSN diffusion, may change before and after a country's diffusion peak has been reached.

The separation of the effects of the *indirect network externalities* between early and late adopters is captured by estimating country-specific *interaction effects*. These estimates are then used to assess the role played by marketing strategies on penetration prices, smartphones' diffusion and usage time for MSNs' diffusion and whether these influences are changing depending on their timing along the MSN diffusion process.

Data

In the first estimation stage, quarterly time series of MSN adoptions are used to estimate seven individual logistic diffusion models for the analyzed countries: US, UK, France, Brazil, Germany Italy and Spain. The data for MSN are provided by comScore² and it covers the period from the first quarter of 2007 to the second quarter of 2014. In the second estimation stage, the paper uses quarterly data, from GSMA intelligence³, covering the same time period and the same countries, for the group of covariates of interest such as: *The level of smartphones penetration, average revenue per user (ARPU), Minutes per connection per month, Mobile market penetration*.

Results

The main results from this paper are the estimates of these indirect externalities as predictors for MSN adoptions separately for early and late adopters, before and after the MSN adoption peak has been reached. We show that these effects can be significantly different depending on whether MSN adoption is in its early pre-peak stage, when only early adopters are moving to the new services, or adoption has already reached its peak and late adopters are also *choosing* the, by now widely adopted, MSN services. Of particular managerial interest is the evidence of a *lock-in effect* whereby low penetration pricing strategies were associated with the early stages of MSN diffusion and their effect is reduced after MSN diffusion had reached its peak. Of particular interest from the users' point of view, but with clear repercussions for business strategies as well, is the result that usage time is a substitute for MSN adoption as if MSNs would attract consumers who are less time-intensive mobile phone users. Finally, the coupled dynamics of MSN and smartphones' adoptions reveals some new details and differences between early and late adopters. In the early stages of MSN adoption, smartphones and MSN are key complements. In the later stages of MSN adoption, the indirect network externality of having a large smartphones users' base, and consequently fewer new smartphones additions,

² <https://www.comscore.com/About-comScore>

³ <http://www.gsma.com/aboutus/>

also becomes relevant for the late MSN adopters, reducing the strength of the pre-peak complementarity between MSN and Smartphone adoptions.

Policy implications

According to our results, any policy objective addressing the usage of MSN for participation, education, and other societal purposes would also need to take into consideration these time-varying effects of the direct and indirect network externalities in shaping early and late MSN adopters' choices. From a policy point of view our results can be relevant for international organizations and regulators on policy formulation. In particular, the identification of threshold effects and network externalities in the process of adoption of MSN is essential to assess the correct timing for effective policy intervention. Also, the regulatory environment and market competition analysis should take into account the role that network externalities may play in potentially creating market dominance and the possibility of market tipping.

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