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Is China uniform? Intra-country differences in the takeoff of new products

Ying Li^{a,*}, Gerard J. Tellis^{b,1}

^a Management Science and Engineering at the School of Business, East China University of Science and Technology, 130 Meilong Road Box 114, Shanghai 200237, China

^b Marketing and Management & Organization, Director of the Center for Global Innovation and Neely Chair of American Enterprise at the Marshall School of Business, University of Southern California, P.O. Box 90089-0443, Los Angeles, CA, USA

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ABSTRACT

Multi-national corporations (wrongly) introduce new products in China rather late. Such a strategy arises because research treats all of China as one monolithic country, thus, finding that takeoff occurs quite late. However, for large or multi-ethnic countries, intra country diversity may be quite high, rivaling or exceeding that among inter country differences of some continents (e.g., Europe). This study examines the takeoff of new products among provinces of China based on data of 30 Chinese provinces on 10 categories over 34 years. Rooted in the theory of institutions and product network externalities, this study tests the drivers of new product takeoff using a discrete time hazard model. The major results are as follows: First, time to takeoff varies dramatically across provinces in China. Second, the average time to takeoff varies substantially between products with strong and weak network externalities. Third, time to takeoff is converging across provinces. Fourth, the intra-country differences in time-to-takeoff are explained by economic institutional variables: economic wealth, trade openness, education, media and transportation infrastructure; and product characteristics: network externalities and year of introduction. Fifth, the vast differences in takeoff of new products across provinces suggest that a waterfall strategy within China might be more profitable.

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1. Introduction

Apple introduced the iPhone in China 2 years after it was introduced in the US², despite high demand in China (Mozur, 2012). In so doing, Apple lost potential revenues to rival brands and smuggled versions of its own brand (David, 2008). Such late introductions of new products in China may emerge from an inter-country waterfall strategy that recommends that new products be introduced earliest in a country where the takeoff of the new products occurs earliest (Chandrasekaran and Tellis, 2008; Tellis et al., 2003). For example, Chandrasekaran and Tellis (2008) rank China as one of the slowest countries worldwide for takeoff of new products. This conclusion emerges from their (and other researchers) assuming China is one monolithic country, where that assumption may not be valid.

The takeoff is the first dramatic and sustained increase in a new

product's sales. It is the point of transition between the introduction and growth stage of the product life cycle (Golder and Tellis, 1997). Understanding the timing and causes of sales takeoff is critically important for industry analysts and managers because a sudden and sharp increase in sales requires enormous resources in terms of manufacturing, inventory, distribution, and support (Tellis et al., 2003).

The existing literature on takeoff considers each country as a single entity, implicitly assumed within-country homogeneity. For example, Agarwal and Bayus (2002) models the takeoff of consumer durables in the United States. Tellis et al. (2003) analyze the takeoff of consumer durables across 16 Western European countries. Chandrasekaran and Tellis (2008) extend the domain to 27 countries, including some developing countries. Everdingen et al. (2009) examine the global spillover of foreign product introductions and takeoffs across 55 countries. Haapaniemi and Mäkinen (2008) analyze the effects of national attributes in the timing of takeoff.

However, for large countries, intra country diversity may be quite high. We use word diversity to refer to the heterogeneity of institutional environments on business systems across provinces (Krug and Hendrischke, 2008). As far as we know, no existing

* Corresponding author. Fax: +86 21 6245 1324.

E-mail addresses: liying@ecust.edu.cn (Y. Li), tellis@usc.edu (G.J. Tellis).

¹ Fax: +1 213 740 7828.

² The iPhone (1st generation) was introduced in US on June 29, 2007, while iPhone (3GS) was firstly introduced in China on October 30, 2009.

studies examine takeoff within a country. Relevant literature occurs in the related field of diffusion modeling. Although studies in this area are extensive (Meade and Islam, 2006), most of them typically analyze the process at a national level, ignoring variations within a country. Only a few studies examine how the parameters of the diffusion model vary across intra-country regions (Alderman and Davies, 1990; Ding et al., 2010; Redmond, 1994). Steffens (1998) empirically demonstrates that taking account of regional differences improves both short- and long-term prediction of national sales of a new product under certain conditions. Understanding what factors impact the takeoff within a country provides valuable insights that can aid in designing strategies for launch, pricing, promotion and distribution tailored to the differences.

The present study focuses on the variation in time-to-takeoff between provincial level divisions³ of the People's Republic of China (referred as China, hereafter). We choose China as a domain of analysis for two reasons. First, China is a huge emerging market with the largest population and currently the second largest economy in the world. Second, despite its size, prior research in diffusion, market entry, and product takeoff treats China as a single entity (Chandrasekaran and Tellis, 2008; Hauser et al., 2006).

This study seeks answers to the following research questions: First, how does time-to-takeoff vary across provinces in China? Second, how does time-to-takeoff of various provinces of China compares to that of various countries estimated in prior studies? Third, are the takeoff patterns across provinces diverging or converging to the shortest time or the longest time among provinces? We use “converging” to refer to the decrease in the range of the years of takeoff across provinces, which could occur in the direction of the province with the shortest takeoff or the one with the longest takeoff. Fourth, what drives the variation in time-to-takeoff across provinces: Is economic institutional environment relevant? We examine these issues by studying a heterogeneous sample of 10 categories across 30 provinces in China. This is the most extensive study ever conducted on the growth of new products within China.

To answer these questions, we draw on theories of institutions and network externalities. The acceptance and adoption of new products are inevitably affected by the institutional environment that establishes the framework in which the diffusion takes place (Zhao et al., 2007). Prior literature suggests that the institutional environment is important in the diffusion of innovation (Kshetri and Dholakia, 2005; Lynn et al., 1996). In particular, we look at economic institutional variables, including economic wealth, trade openness, education, media, and transportation infrastructure. While institutional theory emphasizes the effect of institutional environment, it does not include the effect of product characteristic. To compliment institutional theory, we also apply the theory of network externalities.

Our study differs from previous work mainly in two ways. First, it examines the factors that effect within-country variations in new product takeoff at provincial level. Previous studies consider each country as a single entity. However, for large countries, intra country heterogeneity may be quite high. Given the strategic importance of subnational regions (Porter, 1998), this study explores how the differences among within-country regions explains the timing of new product takeoffs. Second, it attempts to contribute to the current body of literature by offering an institutional explanation of new product takeoff. Institutional theory provides a valuable framework to further our understanding of the

phenomenon of new product takeoff within a country. It is different from the rational economic perspective, which emphasizes individual self-interest, conscious decision making, and economic optimization (Shi et al., 2008).

This paper is organized as follows. Section 2 presents the theory and research hypotheses. Section 3 explains the data collection, sources, measures, and model for the analysis. Section 4 describes the results. Section 5 discusses the findings, implications, and limitations.

2. Theory and hypotheses

Our theory is rooted in the theory of institutions and network externalities theory⁴. In the following subsections, we advance general arguments and derive hypotheses for new product takeoff.

2.1. Economic institutions

Institutional analysis defines institutions as ‘cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior’ (Scott, 1995) or as governance structures and social arrangements (Williamson, 1985). Institutions constitute the rules of the game, both formal (such as regulations and laws) and informal (such as codes of conduct and norms), that structure the economic, political, and social relationships in a society or country (North, 1990; Scott, 1995). Institutions can reduce uncertainty in transactions between people by providing a structure within societies (Eggertsson, 1990; North, 1990). According to institutional theory, the institutional environment operates at different levels (e.g., country, region, organizational level etc.) (Chan et al., 2008; Griffiths and Zammuto, 2005), provides economic infrastructure, imposes regulations, and defines social norms that set the ‘rules of the game’ (North, 1990) for both individual and organizational activities (Chan et al., 2010; North, 1990; Scott, 1995).

We regard provinces as territorial entities whose political boundaries coincide with their institutional boundaries (Chan et al., 2010). They shape the development of the regional institutional environment. The acceptance and adoption of new products is inevitably affected by the institutional environment that establishes the framework in which the diffusion takes place (Zhao et al., 2007). The majority of China's population belongs to the same race (BBC News magazine, 2012). Several studies have reported that China tends to be culturally homogeneous relative to large national groups such as United States and India (Gupta and Li, 1999; Jiao, 2001; Li and Shiu, 2012). The political policy and social culture are all very similar, if not identical, across provinces (Li and Shiu, 2012). Hence, we propose the primary reason for the differences of time to takeoff in China's provinces is economic institutional environment.

The development of economic institutions varies across the subnational regions within a country (Chung, 2002; Schlevogt, 2002). Five dimensions of economic institutions play an important role on new product takeoff: economic wealth, trade openness, education, media, and transportation infrastructure (Chan et al., 2008; Douglas and Craig, 2011; Holmes et al., 2013; Orr, 1987; Zhao et al., 2007). Albeit moderately correlated, these five

³ Provincial level division is the Chinese highest-level administrative division (referred as province, hereafter). Types of provinces include: municipality, province, autonomous region, and special administrative region.

⁴ We do not include the effect of product price and elasticity of cross price in this study because the data is not available. Some literature explains the effect of these two economic concepts. Golder and Tellis (1997) analyze the effect of price to new product takeoff. Tarn and Hui (1999) study the price elasticity and diffusion of computers. Kim and Srivastava (2007) develop a simultaneous equation model that incorporates the cross-price effects on inter-category dynamics for technological product markets.

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