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Successive changes in leadership in the worldwide mobile phone industry: The role of windows of opportunity and firms' competitive action

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ABSTRACT

We take a historical perspective to gain insight into the determinants of changes in industrial leadership in the global mobile phone industry from the beginning of the 1980s to 2012. The theoretical foundation of our analysis is (a) the concept of 'windows of opportunity' proposed by industry evolution studies, i.e. changes in the technological, regulatory and consumer demand environment offering latecomers the opportunity to overtake leading rivals, and (b) the concept of 'action aggressiveness' proposed by the competitive dynamics literature, i.e. the extent to which a firm forcefully takes a large number and a wide variety of actions to outperform its competitors. We show that the potential for leadership changes is greater for firms that are able to undertake 'aggressive' competitive actions at the time when 'significant' windows of opportunity are open. In particular, we analyze the determinants of two leadership changes: (1) in the second half of the 1990s, when the US giant Motorola lost its number one position, dethroned by its Finnish competitor Nokia; and (2) in the first half of the 2010s, when Samsung of South Korea caught up with Nokia.

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1. Introduction

"In the analog era, it was difficult for a latecomer to catch up [. . .] But in the digital era, if you are two months late, you're dead. So speed and intelligence are what matter, and the winners haven't yet been determined."

(Interview with Samsung's CEO and Vice Chairman Yun Jong Yong. From Edwards et al., 2003, Businessweek).

A central issue in industry evolution studies is to understand how firms sustain their leadership, dethrone leaders, or close the market share gap between themselves and leaders (Abernathy and Clark, 1985). Such an issue has been addressed in three main streams of literature.

First, the technological change literature (Tushman and Anderson, 1986) has described technological discontinuities as the main factors determining leadership changes. Radical technological changes are likely to destroy the value of the knowledge and

competences accumulated by firms through the life cycle of the old technology, and often weaken the competitive position of those incumbents that continue to rely heavily on the old technology and fail to sense and act on shifts in consumer preferences (Christensen, 1997). Firms winning in the old technology may fall into 'competency traps' (Nelson and Winter, 1982): difficulties of changing organizational routines and a reluctance to adopt disruptive technologies nullifying profits from the existing products.

Second, the literature about catching up by latecomer countries (Malerba and Nelson, 2012) argues that the occurrence of catching up is related to the intensity and number of 'windows of opportunity' (Guennif and Ramani, 2012; Lee and Lim, 2001). The windows of opportunity argument itself was initially proposed by Perez and Soete (1988) and was based on the idea that "the time of paradigm shift in technological trajectory often serves as a window of opportunity for latecomers since the disadvantages of the latecomers would not be large during such moments of time since everybody is a beginner" (Park and Lee, 2006, p. 721). Expanding on Perez and Soete's (1988) work on new techno-economic paradigms, various studies have progressively extended the concept of the window of opportunity to include changes occurring in market demand (Porter, 1990) and in governmental regulations and interventions (Guennif and Ramani, 2012; Lee and Lim, 2001).

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In particular, Lee and Malerba (2016), by elaborating on the building blocks of sectoral innovation systems (Malerba, 2002), describe windows of opportunity as a multi-dimensional construct based on: (1) the regimes of knowledge and technologies, (2) demand conditions, and (3) the surrounding institutions. The ‘significance’ of windows of opportunity, i.e. the extent to which they represent a radical change in the environment offering a performance advantage to firms that adapt to these changes earlier and better than rivals, determines the likelihood that the potential for a catching-up event will be created, especially when the ‘overconfident’ leader is ‘trapped’ by its inertial behavior, and the challenger is able to ‘respond’ to the changing environment and learn from it (Lee and Malerba, 2016). The authors identify four consecutive stages in the industry catch-up cycle: (1) the ‘entry’ stage, in which the challenger attempts to enter an industry; (2) the ‘gradual catch-up’ stage, in which the challenger narrows the market share gap with the market leader thanks to cost advantages, investments, learning and the gradual accumulation of capabilities; (3) the ‘forging ahead’ stage, where the challenger leapfrogs the market leader by exploiting the windows of opportunity; and (4) the ‘falling behind’ stage, occurring when the new market leader is progressively dethroned by a new emerging challenger.

Finally, drawing on the Schumpeter’s (1934) theory of ‘creative destruction’, the competitive dynamics literature (D’Aveni, 1994; Ferrier et al., 1999; Smith et al., 2001) suggests that firm profitability and market share, as well as the rate of industry leader dethronement, are positively related to *action aggressiveness*. Aggressive firms, relative to conservative firms, are regarded as those that demonstrate greater ‘intensity’ and greater ‘complexity’ of strategic activity (Ferrier, 2001; Ferrier and Lee, 2002). Competitive dynamics theorists have defined ‘strategic intensity’ as the firm’s capability to “carry out a large number of competitive actions in rapid succession” (Ferrier and Lee, 2002, p. 164), and ‘strategic complexity’ as the “extent to which a sequence of actions is composed of actions of many different types” (Ferrier and Lee, 2002, p. 164).¹

Although authors from these three streams of literature have offered various arguments and empirical evidence on the determinants of leadership changes, some important issues remain unexplored. First, there is no empirical evidence in the catching-up of latecomer country literature on how the three windows of opportunity (i.e., relating to technology, regulation and demand) contribute jointly to determine leadership changes in a specific industry. Second, although a few empirical studies in the technological change literature have combined technological discontinuities and firms’ strategic posture in explaining firms’ competitive advantage (Doz and Kosonen, 2008; Giachetti, 2013; Jenkins, 2010), there have so far been no studies specifically centered on how firms can adapt their competitive action to better exploit the opportunities offered by changes not only in the technological environment, but also of the demand and regulatory environment. Third, although scholars in the competitive dynamics literature have shown that firm action aggressiveness is an important firm-level driver of changes in industrial leadership (Ferrier et al., 1999; Smith et al., 2001), there is a lack of studies looking at its interplay with *macro(industry)-level* factors, like windows of opportunity.

¹ The Lee and Malerba (2016) framework for exploring the process of leadership change in industries includes a component about firms’ strategies in responding to windows of opportunity. This overlaps in part with the aspect of the competitive dynamics framework that focuses on the complex of firm-level competitive actions contributing to ‘action aggressiveness’. However, that component of the Lee-Malerba framework is embedded in a set of variables concerned with wider characteristics of sectoral systems of innovation. In this paper we focus more specifically on the role of firms’ strategies, as discussed in this paragraph, in influencing changes in industry leadership.

In this paper we draw on and contribute to these three streams of literature. More specifically, within the literature about catching up by latecomer countries we borrow two elements from the framework outlined by Lee and Malerba (2016): both the multi-dimensional perspective on windows of opportunity and the model based around stages in the catch-up cycle. At a broad level we show that, in order to better understand the causes of changes in industrial leadership, both *macro-level* factors related to the external environment (i.e., windows of opportunity), and *micro-level* factors related to firms’ competitive behavior, should be taken into consideration and analyzed in combination. In particular, we contribute to the existing literature by showing that in the forging ahead phase the potential for leadership change is greater for firms that, at the time when the windows of opportunity emerge, are able to outperform competitors, undertaking aggressively those competitive actions which prove to be the most appropriate to gain market share in the changing environment.

Our empirical evidence is grounded in an historical analysis of leadership changes in the global mobile phone industry, from the beginning of the 1980s, when the first handset was introduced to the market, to 2012.

The remainder of this paper is structured as follows. In section two, we describe the methods used to investigate the determinants of leadership change in these two episodes. In section three, we describe the results of our historical analysis. Finally, in section four we conclude with a discussion of our findings.

2. Methods

2.1. Research design

Our analysis is in the spirit of ‘appreciative theorizing’ (Nelson and Winter, 1982), which aims to provide causal explanation of observed patterns, mainly by means of storytelling (Jenkins, 2010). We take a historical perspective to gain an insight into the long-term dynamics of changes in industrial leadership and the occurrence of windows of opportunity in the global mobile phone industry. This is an historical account of an industry in which outcomes can be measured and compared over time. We look for repeated patterns of changes in leadership that can only be observed at historical timescales (Fine, 1998). A historical perspective allows us to explore emergent principles and to examine the highly contextual relationships between changes in the environment (‘windows of opportunity’ in the specific case of our analysis), firm competitive actions and their performance (Jenkins, 2010).

The analysis is divided into two periods, covering the history of the mobile phone industry from its inception in the early 1980s until 2012. Each period is delineated by a change in industrial leadership: (1) in 1998 the US giant Motorola was dethroned by the Finnish competitor Nokia; and (2) in 2012 Samsung of South Korea overtook Nokia (Fig. 1). The two changes in leadership were observed not only at the global level, but also in several countries (Table 1). Fig. 1 and Table 1 show that global market share leaders (Fig. 1) were also those which had the capabilities to attain leadership positions in the largest number of countries, irrespective of their differences in size and barriers to entry (Table 1).

2.2. Data

The comparative historical research design posed demanding requirements for data that were not readily available in a suitable form in existing sources—broadly, two types of firm-related information spanning a period of about twenty years. The first type was information about the broad evolution of the mobile phone industry in terms of market and technology trends, as well as changes

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