



# New product development and firm value in mobile handset production

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## ABSTRACT

We study the effect of new product introduction on firm value. Using a unique sample on mobile phone handset introduction by the 16 largest major handset manufacturers from 1992 to 2002, we distinguish between truly innovative product introduction and imitative product introduction. We find that while most product introduction is imitative, both types of innovation increase firm value. However, truly innovative innovation is found to increase firm value by more than imitative introductions.

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## 1. Introduction

Wireless markets trigger the innovation of new technologies and products that are subsequently used and applied throughout the economy. The widespread adoption of new wireless technologies provides substantial growth opportunities for firms (Helpman and Trajtenberg, 1998; David and Wright, 2003), and the discussion on the “digital divide” suggests that economies depend on an advanced telecommunications infrastructure (including wireless) to prosper (Röller and Waverman, 2001; Czernich et al., 2009). Given that there are potentially divergent public and private incentives for different types of innovations, it is important to consider the impact of the introduction of innovative products on firm value to identify a starting point for further studies on differences between socially desired and privately executed innovative activity.

This paper therefore takes a first look at patterns of successful, growth facilitating product innovations in cellular handsets. Handset producers adopt different innovation strategies (specifically imitation and “true” innovation) to create value. These competitive strategies determine which kinds of innovations are launched and how, i.e. whether consumers and other firms are offered new wireless technologies with incremental improvements or with drastically new technological features. These innovation strategies also determine the impact of new wireless technologies on economic growth. They also determine the extent to which a new service or technology penetrates the economy. For example, the success of SMS technology was made possible only by the introduction a series of drastic (e.g. technical SMS functionality) and incremental (e.g. auto-completion of words) innovations embedded in a large number of wireless handsets.

In addition to being truly innovative or imitative, a handset encapsulating novel features can also contain features that make it more attractive to all consumers (vertical innovation) or only a subset of them (horizontal innovation) mobile handset industry. In the 1990s, competition moved from vertical technological improvements such as decreased handset weight to horizontal

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innovations increasing customer segmentation and product differentiation to attract replacement demand for handsets (Koski and Kretschmer, 2007).<sup>2</sup>

Firm strategies on research and development and product introduction in this market therefore entail multiple decisions. Firms have to decide if they want to engage in vertical and/or horizontal innovation and whether, or to what extent, to imitate technological leaders or to expand the technological boundaries themselves. In this context, we can think of several empirical issues to address:

- (i) First, *is truly innovative or imitative product introduction more conducive to increasing firm value?* A naïve view would state that true innovations create more value for the firm as something genuinely new is introduced (and valued) by the market. However, this view does not consider the cost of R&D for a truly new product. If these costs were high and second-movers could imitate an introduction quickly, the market would value imitative product introduction more highly since the same technology can be used for a fraction of the cost. Given that we consider only successful product introductions (i.e. ones that resulted in a product for the end consumer market) however, we would expect true innovation to increase firm value more than imitation.
- (ii) The second question arising from the distinction between horizontal and vertical innovation is the following: *will vertical innovation increase firm value more than horizontal innovations?* The answer to this question again depends crucially on the degree to which these types of innovations can be imitated. While it might seem intuitive that vertical innovations (which are valued by all consumers) should be more profitable than horizontal ones, it will also be the case that vertical innovations will attract more imitative product introduction than horizontal innovation. In other words, a dominant design on vertical product characteristics might emerge, while products remain differentiated horizontally. Assessing the relative effect of these is the second empirical task we face.
- (iii) A third question we ask is: *does the impact of product introduction on firm value change over time?* Given that a shift in innovative behavior can be observed in this market (Koski and Kretschmer, 2007), the hypothesized ranking of true innovation over imitative product introduction over no new products may change if continued innovation becomes more expensive and/or easier to imitate (Adner and Zemsky, 2006), so that imitation becomes more profitable compared to true innovation.

Various previous studies have found that R&D investments – typically measured very broadly – and new product announcements are positively related to firm valuation

(see, e.g. Kelm et al., 1995; Chen et al., 2002; Sharma and Lacey, 2004; Cho and Pucik, 2005; Connolly and Hirschey, 2005). Our paper aims to give a more nuanced picture of the relationship between innovative activity and firm value. Specifically, we use a sample of the 16 largest mobile handset manufacturers and their product introduction decisions in the time period 1992–2002, and further match the data with their phones' characteristics and firm financial information to see how new product introductions relate to firm value. Using Tobin's Q, a standard measure of shareholder value in innovation studies (Hall, 1999), as our measure of success, we also study how the competitive landscape affects the product introduction–firm value link to see whether being an innovation leader or imitating seems a more profitable strategy.

We find that new product introductions are positively related to firm value, and that the firms that are able to take a technological lead in innovation in the wireless markets are valued more highly than others. Our data show that until the late 1990s, mobile manufacturers derived competitive advantage from technological leadership in terms of handset size, talk and standby times, but thereafter, as this advantage vanished, the firms needed to employ other, more horizontally oriented, innovation strategies.

The paper is organized as follows. Section 2 documents product introduction patterns in the cellular handset industry during the period of 1992–2002 and introduces the key explanatory variables of our empirical study. Section 3 analyses the relationship between new product introductions and firm value. Section 4 concludes.

## 2. Product introduction patterns in the handset industry

Our data comprise information from 1826 new handset model introductions of 16 cellular handset manufacturers during the years 1992–2002 (see Appendix A.1 for the list of sample companies). The specific handset features (such as weight and talk times) are compiled from the EMC World Cellular Database and then merged with the manufacturer specific financial information extracted from Datastream. The 16 companies in our sample represent the major players in the global mobile phone markets: their share of all new handsets launched between 1992 and 2002 recorded in the EMC World Cellular database is 84%. While it is not possible to measure market share with our data as we do not have sales figures for each model, we cover the most important firms in the global handset market.

Table 1 illustrates the number of new cellular phone models launched monthly by the companies in our sample. In about 70% of the monthly firm-level observations, there have been no new cellular handset introductions. Typically, a manufacturer introduces between one and three new handset models (conditional on the firm introducing any new models), but during the peak growth years of the market for cellular telephony some companies took 10–25 new handset models to the market in a single month. In our empirical analysis, we measure the log (monthly) number of new handset model introductions by a firm by the variable `NEW_HSET`. We also control for the handset models a

<sup>2</sup> Koski and Kretschmer (2007) also document an intricate pattern of imitation and differentiation – some features are copied rapidly by other handset producers and form part of the “dominant design”, while others remain sources of product differentiation.

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