

New product development and firm value in mobile handset production

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1. Background

- Innovation strategies handset producers choose to adopt determine
 - how drastic innovations are launched (i.e. whether users are offered new wireless technologies with incremental improvements or with drastically new technological features)
 - order of magnitude of economic growth that can potentially be derived from the diffusion of new wireless technologies.

Background

- During the 1990s, switch from “vertical” to “horizontal” innovation: competition moved from technological improvements aimed at decreasing handset weight and size, and increasing talk and standby time, towards increasing customer segmentation and product differentiation to attract replacement demand for handsets in the mature market areas.
- Various previous studies have shown that R&D investments and new product announcements are positively related to firm valuation

2. Our contribution

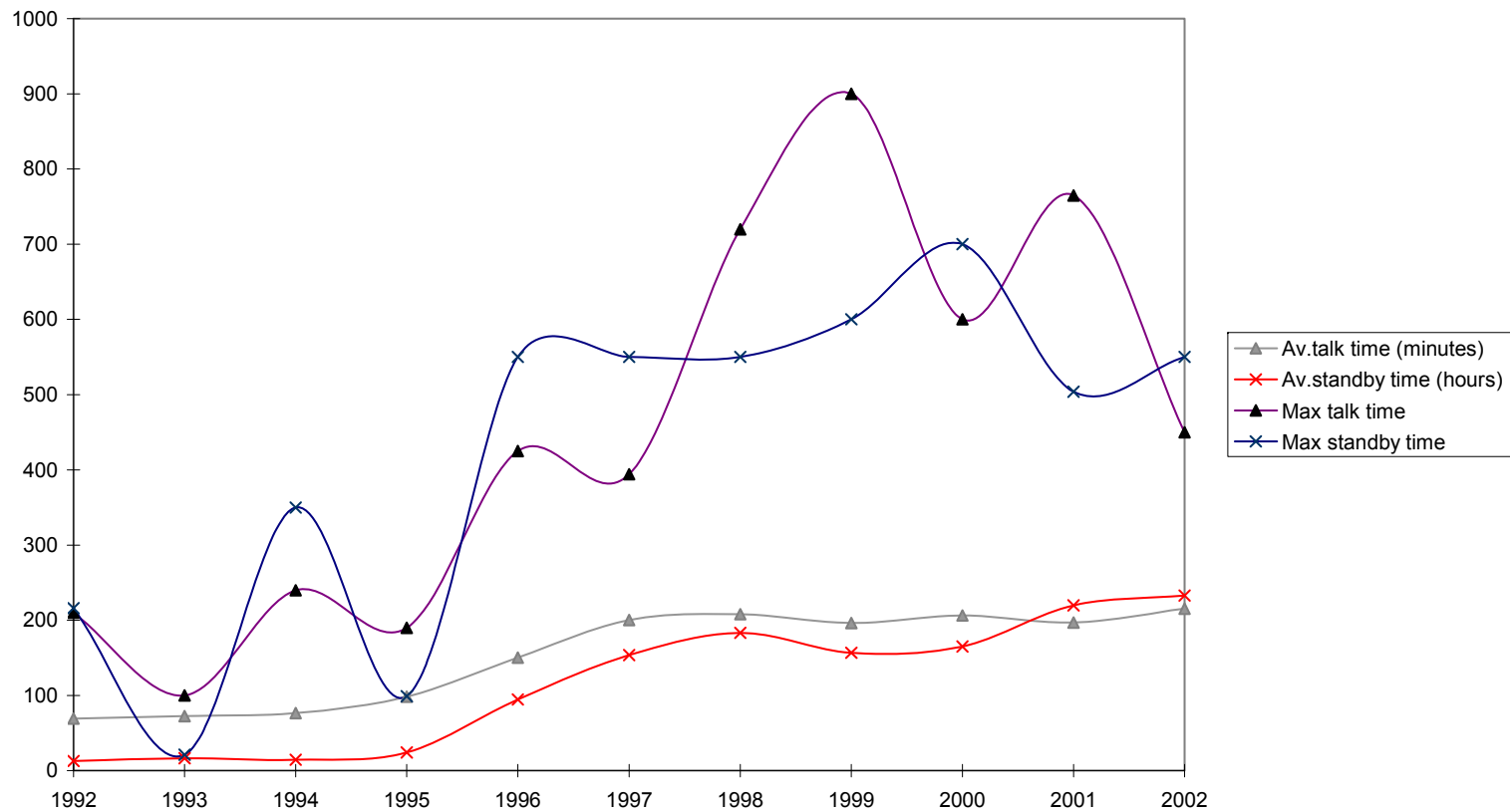
- Our paper aims to give more nuanced picture of relationship between product introduction and firm value.
- Using Tobin's Q, standard measure of shareholder value, we also study whether being innovation leader or imitating seems more profitable strategy.

3. Data

- 1826 new handset model introductions of 16 cellular handset manufacturers during the years 1992-2002
- Handset specific features (e.g. weight and talk times) are compiled from the EMC World Cellular Database and then merged with manufacturer specific financial information extracted from Datastream
- 16 manufacturers' (Nokia, Ericsson, Motorola, Alcatel, Fujitsu, Hyundai, JRC, Maxon, Mitsubishi, NEC, Philips, Samsung, Sanyo, Sharp, Toshiba, Sony) share of all launched new handsets during 1992-2002 recorded to the EMC World Cellular database is 84%

Innovation performance: leader vs. average firms

Technological leader vs. average firms: talk and standby times



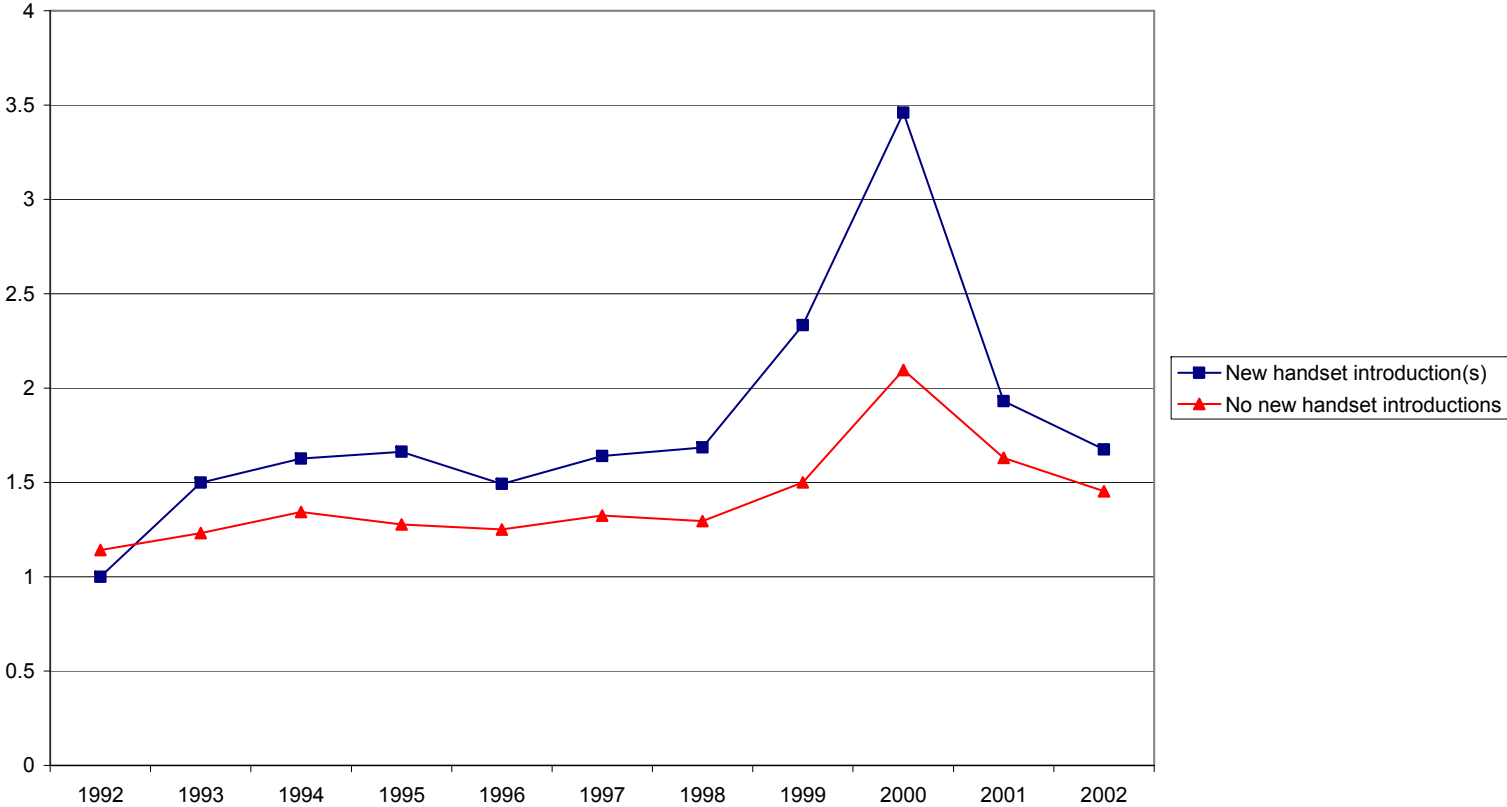
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4. Product introductions and firm value: Descriptive analysis

- We use the following approximation of the theoretical Tobin's Q measure to measure firm value: *(common shares outstanding * prices + book value total assets - common equity) / book value total assets.*

Tobin's Q: new handset introductions vs. no new handsets

Tobin's Q monthly average for firms with new handset introductions vs. no new handsets



5. Empirical analysis

- We estimate the fixed effects model to analyse relationship between product launch and firm value.

Major explanatory variables:

- **New product introduction:** a) Log number of new mobile handsets firm has introduced during the current month & b) during prior 3 months
- **Vertical innovation performance** (leaders vs. complete imitators): Sum of three dummy variables that get value 1 if handset models firm has introduced during sample year: i) have greater talk time, ii) have greater standby time and iii) are lighter, on average, than all handset models introduced during the year, and 0 otherwise

- **Horizontal innovation:** No sufficient data (games, design features: clamshells etc.) but as inclusion of additional features to given handset model decreases its talk & standby time, we use dispersion (coefficient of variation) in talk and standby times of firm's new handset models as indicator of its horizontal innovation strategy
- **Product mix strategy** in terms of technological standards: log number of new GSM, CMDA, TDMA, PDC and analogue handset models firm has launched given year

6. Estimation results of fixed effects model for firm value

Log(Tobin's Q)	Robust Coefficient	T-value
NEW_HSET	0.002*	1.97
NEW_HSET_3MONTH	-0.001	-0.15
TECH_LEAD	0.058***	3.01
SIZE	0.098	1.4
CV_STANDBY	0.011	0.37
CV_TALK	0.003	0.1
CV_STANDARD	0.073	1.43
SALES_GROWTH	-0.054	-0.99
DEBT	-0.779**	-2.16
PROFITABILITY	0.092	0.42
Year dummies	Yes	
Monthly dummies	Yes	
Constant	-1.190	-1.39
No. Obs.	1284	
R ² within	0.55	
R ² between	0.38	
R ² overall	0.42	

* = statistically significant at the 10% level

** = statistically significant at the 5% level

*** = statistically significant at the 1% level

Estimation results

- Relationship between number of new mobile handset models firm has launched and its market value is positive and statistically significant.
- Leading vertical innovators have greater market value than technological imitators
- true innovators not only may be able to generate higher margins from their technologically superior handsets but they are also building intellectual capital that increases value of firm

- Estimating model using split samples (early: prior to 1998, late: 1998 and after) shows that technological lead variable is highly statistically significant in early sample while it does not explain variation in firm value significantly later
- competitive advantage that cellular manufacturers have derived from technological leadership in terms of handset size, talk and standby times had vanished by late 1990s, and firms thereafter needed to employ other, more horizontally oriented, innovation strategies

- Differences in firms' horizontal innovation and product mix strategies do not explain variation in firm values significantly
 - Possible explanation: Imitation in handset production substantial: innovative and successful handset features are copied rapidly by the competitors, reducing returns from such horizontal innovation efforts.
 - Also possible that our variables measure firms' product differentiation strategies too imprecisely.

7. Conclusions

- Our paper illustrates that new product introductions result in greater firm value in a technologically dynamic market in which technologies evolve and improve constantly.
- First reported research (to our knowledge) to explicitly consider different competitive positions of firm's new product portfolio.
- Our results suggest that mobile phone manufacturers launching new cellular handset models closer to technological edge do create more value for shareholders than other firms. That is, taking technological lead is seen as indicator for long-term viability and profitability, even though current successful product may be copied or imitated fairly easily.