The genesis of fabless business model: Institutional entrepreneurs in an adaptive ecosystem

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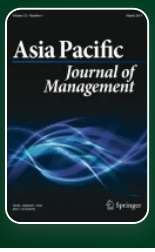

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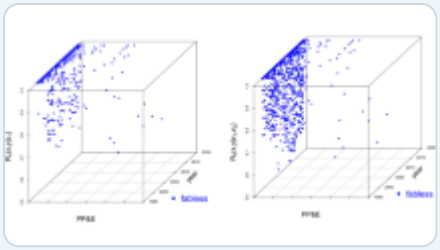
Abstract

How does an institutionally-contested business model originate, survive, and grow? What roles do institutional entrepreneurs play in the different stages of evolution of the business model? In the past four decades, the fabless model (which allows a semiconductor firm to operate without a fabrication unit) has changed the global semiconductor industry with significant impact in the Asian regions. In this paper, we trace the origin and evolution of the fabless model through a mixed-method approach, utilizing historic milestones, events, and financial data of publicly-traded semiconductor firms. We have applied theories of institutional entrepreneurship and adaptive ecosystem to identify four stages in

this history: differentiation, mobilization, legitimization, and symbiosis to conceptualize the fabless model's co-creation and co-evolution. Our findings indicate that actions of institutional entrepreneurs within specific temporal locations and structures played a crucial role in the fabless business model's origin and co-evolution.



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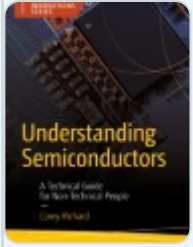

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Notes

1. *Businessweek* Archives “Real Men Have Fabs.” Apr. 10, 1994: http://www.bloomberg.com/bw/stories/1994-04-10/real-men-have-fabs.

2. As told by Dr. Morris Chang, who pioneered a controversial pricing strategy of semiconductors ahead of the cost curve (as per featured interview with Dr. Chang, SemiWiki.com, Daniel Nenni)

3. Source: IC Insights: http://www.icinsights.com/news/bulletins/Nine-Of-The-Top-20-Semiconductor-Suppliers-Are-Forecast-To-Register-DoubleDigit-Growth-In-2014.

4. Xilinx gradually started contracting with several suppliers to spread their risk on timely supply and price fronts. After UMC started offering foundry services, Xilinx shifted their complete production to it. In turn, the FPGA technology helped UMC to ramp up and improvise their process technologies and quality control. Xilinx is now market leader today with over 2500 patents on FPGA, and maintain deep relationships with the foundries for their latest process technology.

5. Liou (2011: 955) suggests to use "ROIC – WACC – r" to describe the return on intangible assets (or "light assets"). In our sample, we found that Fabless group has significantly higher ROIC – WACC – r than IDM group (t value = −1.95, $p < 5\%$). It supports our proposition that fabless model has different way of distributing resources and power.

6. Gompers (1995) found that venture capital shows an increasing exponential during the period 1980–1990.

7. FSA and GSA history in Wikipedia: https://en.wikipedia.org/wiki/Global_Semiconductor_Alliance.

8. Higher market value of equity (evaluated from investor) results in higher Tobin's Q, a market-based performance measure. Banalieva, Eddleston, and Zellweger (2015: 1365) suggest that "it is considered a forward-looking measure since it incorporates investors' expectations about firm performance." Therefore, we are confident that investors in public market are more likely to pay a higher price to invest in fabless firms than to invest in IDMs. However, since Tobin's Q is a ratio, slight difference could be sensitive to the investor. So, we carried out T-test for two groups, and find t value = 13.66, ($p < .001$). We further tested the standard deviation of Tobin's Q within three-year periods, which can proxy the investor's risk (Lang & Stulz, 1993). We found that fabless group has significantly higher risk than IDM group (t value = 8.54, $p < .001$).

9. In fact, IBM paid GF $1 billion to take away its foundry. See http://www.eetimes.com/document.asp?doc_id=1324321 and SemiWiki.com.

10. Source: Hruska J. 2014. TSMC announces its first 16 nm FinFET networking chip: 32-core ARM Cortex-A57. Sept. 26, ExtremeTech: http://www.extremetech.com/computing/190941-tsmc-announces-its-first-16nm-finfet-networking-chip-32-core-arm-cortex-a57. Accessed Apr. 14, 2015.

11. Source: IDC. 2015. Smartphone vendor market share, Q4 2014: http://www.idc.com/prodserv/smartphone-market-share.jsp.

12. Source: Lan, K. 2015. Rockchip works closely with Intel on Atom X3 based nobile devices. *CTIMES*, Apr. 08: https://en.ctimes.com.tw/DispNews.asp?O=HJZ48BYMOC2SAA00NP.

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