



Unlocking the Secrets of Entrepreneurial Innovation: How to Create a Killer App

Entrepreneurs in mobile ecosystems are learning how to create killer applications that can disrupt resource rich, entrenched players.

The term “killer app” was redefined last month when Facebook announced its US\$19 billion purchase of instant-messaging service WhatsApp to great fanfare, and equally great controversy. Mark Zuckerberg countered critics by arguing that WhatsApp was worth even more than Facebook paid, despite not yet having leveraged its enormous reach into a comparable revenue stream. “The reality is that there are very few services that reach a billion people in the world,” Zuckerberg said. “They are all incredibly valuable, much more valuable than [US\$19 billion].”

Though WhatsApp-level triumphs are few and far between, the Facebook deal must strike mobile app developers as a confirmation of their wildest hopes. On an average day, more than 130 apps are uploaded to the iTunes store, most of these by smaller ventures angling for attention in a marketplace already teeming with competition. Developers know that even if they achieve success, it will first register not in their wallets but in the top ranking lists of the leading online app stores, iTunes and Google Play. Without that exposure, their app will not become killer; instead, it may die on the vine.

Innovation in “Killer App” Ecosystems

If achieving high rankings on iTunes and/or Google

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Play is the goal, what’s the best way to get there? Despite great interest in entrepreneurial companies as a source of innovations, there has been very little research on entrepreneurial innovation strategies, perhaps because a large database with fine-grained measures of entrepreneurial innovation had not been available until the emergence of mobile apps. For the paper “Entrepreneurial Innovation: Killer Apps in the iPhone Ecosystem” (forthcoming in *American Economic Review*), I and my co-authors Pai-Ling Yin (of Stanford University) and Yulia Muzyrya (of University of Michigan) analysed data for more than 300,000 apps on iTunes over an approximately year-long period in 2010-2011, paying special attention to innovation actions taken before a developer entered the top rankings for the first time.

The results were illuminating on two fronts. First, although many developers appeared to have waded into the marketplace without an innovation strategy, hoping they would hit upon success through random experimentation, others appeared to be working from a playbook. Second, the success of the developers’ strategies had much to do with the type of app they produced. “Killer apps” that were games tended to have a different history than non-game “killer apps.”

While non-game apps tended to fare better after

being updated several times, updates did not appear to influence whether games became killer apps. As a probable corollary to this, games were more likely to enter the top iTunes rankings when produced by an app developer with some experience (which was not the case for non-games). With games, in other words, developers often have only one chance to get it right, so experience provides a significant edge.

We believe the difference between games and non-games speaks to fundamental differences in the two market segments. Non-game apps tend to be tools rather than entertainment, and the utility of a tool can be honed over many iterations (i.e., updates), with customer feedback guiding innovation to a great extent. Gamers, on the other hand, aren't looking for the game to end all games; their "killer app" needs to scratch a somewhat deeper, more obscure itch. For game developers, feedback can be a detriment if it comes from customers outside the game's specific target audience.

Entrepreneurial Solutions to Ecosystem Problems

In the race to the top rankings, developers seem to be hoping to take advantage of the "Matthew effect" – a phenomenon noted by sociologists whereby success replicates itself and snowballs via a feedback loop. To reach the pinnacle of visibility, they must first find a receptive audience – not easy to do from within the mass of more than one million apps available on either iTunes or Google Play.

Because the major marketplaces impose a high degree of anonymity on newly uploaded apps, companies are resorting to entrepreneurial techniques to create demand. These are extensively covered in another paper, "**Economic Value Creation in Mobile Applications**," co-written by Pai-Ling Yin and Timothy F. Bresnahan (Stanford University), for which we surveyed nearly 5,000 apps. The most direct way for a new app to build an audience is simply to buy one, or "incentivise" customers to download through an intermediary firm such as Tapjoy. For a fee, Tapjoy will embed an option into a successful mobile game allowing players to download an app in exchange for in-game currency.

"Incentivised" users are not generally the most highly engaged users, however, so many entrepreneurs try to generate more organic demand by advertising within other apps. In some cases, app-makers will form ad-exchange clubs with peers in the hopes of spurring downloads without having to pay for exposure. But my recent conversations with app-oriented venture capitalists revealed that the industry has begun to acknowledge the necessity of demand-buying. The business maxim "You have to

spend money to make money" has proven relevant for entrepreneurs facing an uphill path toward monetisation of their mobile app.

We found in our survey that if an app has a banner ad, there is an 80 percent chance or greater that it will advertise an app. More than one-third of these apps served ads promoting themselves. Clearly, entrepreneurial app developers are much more likely to need this sort of promotion, as they lack the pre-existing marketing connection with consumers enjoyed by more established firms.

The Shrinking Barriers of Mobile Ecosystems

As we've seen, iTunes and Google Play have made it easier than ever for newcomers in this space to take their apps to market. Once they've entered the game, though, entrepreneurs seeking "killer app"dom must contend with fierce competition as well as the particular quirks of each marketplace. The cost of learning the ropes within either iTunes or Google Play almost certainly is one of the reasons more apps aren't found on both ecosystems. Indeed, we found that among the 4,000 or so most popular apps, just 29 percent of iOS apps and 23 percent of Android apps are on both ecosystems.

At the moment, the mobile app industry is in the experimental phase of its life cycle. In the last few years, we have seen the industry slowly start to come into its own as developers capitalised on the unique capabilities of mobile rather than merely delivering tried-and-true software on a small screen. In the years to come, as the apps themselves become even more sophisticated, new technologies will arise to reduce the cost of development for app entrepreneurs. For example, social media tools will be more effectively employed to help find an audience for new apps, and new software will allow for easier and cheaper porting of apps to multiple platforms.

This transition will likely provide a counterweight to the mighty resource advantage that established firms bring to the table, and consequently make the quest for a "killer app" a good deal less daunting for entrepreneurs.

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