Stanford eCorner

Network Effects 101

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To explain the concept of network effects, Stanford Department of Management Science and Engineering lecturer Ravi Belani contrasts Facebook with Angry Birds. Both grew rapidly in terms of users, but Angry Birds' emphasis on a single-player mode meant that its revenue grew in a linear fashion relative to its customers. On the other hand, Facebook's revenue grew exponentially due to the exploding value of its network.

Transcript

but everybody understands what a network effective, a network effect is something where a product becomes more valuable as it scales its users.. So as the volume of a product, which is an amazing thing.. So usually, as you scale volume, quality suffers.. You know, as you get bigger, you worry that you're gonna be delivering less quality.. But if you build a business that has network effects, the opposite holds true.. As you get bigger, you deliver more value.. The classic example of this is Skype or WhatsApp or any communication tool.. So if there is only, if I tell everybody right now that, hey, I just built RaviApp.. It's exactly like WhatsApp, it's technically identical, everybody should use it, nobody's gonna join RaviApp, even though I'm technically identical to WhatsApp, because the network is on WhatsApp, and the value is the network.. So, or, for example, with Skype, if there is only one person on Skype, how many, you can make zero calls..

If there's two people, you can make one call.. If there's three, you can make three, if there's four, you can make six.. Every extra node that gets added to the network increases the number of connections, and that's generally referred to as Metcalfe's Law, where the value of a communication platform is a proxy to the square of the nodes.. So that's why communication-driven platforms like Skype or WhatsApp can be incredibly powerful.. Others have calculated the value, not just as the square of the nodes but also as an exponential, as a 2 to the n value based on the permutations of the subgroups.. So if you look at the value of Facebook based on all the multitude of subgroups that can emerge, you get an even greater response.. But the idea here is that if you build a business with network effects, every single additional node creates more value for each individual user.. Just to show you how powerful this is, if you look at Facebook, this is Facebook, and it is impressive how quickly Facebook grew.. So Facebook grew at an impressive rate, and that is the red line that you see there at the bottom.. But what's even more impressive is the green dots are their revenue..

The line next to the green dots is a proxy of Metcalfe's Law, that, you know, that exponential growth that we were showing.. So as impressive as their user growth was, what was even more impressive was that their revenue was growing exponentially because of the network effects that are inherent in a social network.. To juxtapose that, there's other great companies, or great phenomenon.. This is Angry Birds, so you guys know Angry Birds, right.. Angry Birds is a single-player mode game phenomenon.. So if I'm playing Angry Birds, that does not increase the value of your Angry Birds experience.. It is your, your Angry Bird's experience does not increase with the volume of the users.. So Angry Birds was amazing, but it was completely linear in terms of, its revenue was just a function of how many people downloaded it.. It didn't become more valuable at scale.. So thinking about how you can build businesses with network effects can also be very powerful, and these again occur, really whenever there's a positive feedback loop..

That can be communication, like Skype, or WhatsApp, or any social network that we've talked about.. It can be a marketplace, so Craigslist or eBay are classic examples of really hard businesses to displace, even though the technology is very, very basic, because there's liquidity of buyers and sellers together on this common marketplace.. Or it can be a platform, like the Apple operating system, where developers are building on top of, every developer that adds to Apple's operating system extends the functionality of the operating system, which then also creates more value, valuable, value for everybody's that's involved.. So there's a type of marketplace that happens with platforms...