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KEYWORDS

Why There Are Never Enough New iPhones

Apple's iPhone X can't be pre-ordered until late October, and even then analysts are predicting shortages



Apple Inc. displayed the iPhone X at the Sept. 12 product event at the Steve Jobs Theater in Cupertino, Calif. The device, Apple's most important new iPhone in years, isn't expected to start shipping until November, with pre-orders starting in late October. PHOTO: DAVID PAUL MORRIS/BLOOMBERG NEWS



By

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The big letdown from Apple's product announcement last Tuesday was news that its most desirable new gadget, the iPhone X, can't be pre-ordered until late October and won't start shipping until November. Even then, analysts are predicting supply shortages. Dealers in Hong Kong expect to sell the phones at a \$300 to \$400 premium in the first weeks they're available.

Shortages of hot new gadgets are so common, it's easy to take them for granted. This past year alone, Google's Pixel phone, Nintendo's Switch and classic gaming-system reboot, and even Apple's iPhone 7 Plus have been thin on the ground.

You'd think after years of hard-won experience, tech hardware companies could deliver goods when and where there's demand—especially at Apple, whose chief executive, Tim Cook, made his name as an operations maestro.

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Are these shortages some kind of Machiavellian marketing play? Calculated risk management? Or is it the case that manufacturing millions of complex electronic gadgets, and distributing them globally, is really hard? It's likely a bit of all of these.

Cold Calculation

Companies often do force early adopters to wait. This is because of the increasingly important pre-order period, says Asokan Ashok, who was at Samsung Research America

from 2009 to 2015, most recently as the director of emerging products & services, and saw many of Samsung's flagship products go from the lab to the consumer.

He says the pre-order mechanism, where customers signal their intent to buy a product before it starts shipping, provides early data that is essential to predicting demand for a gadget and distribution of demand across its various configurations—both notoriously difficult to forecast.

The calculus gets trickier when the device's price hits a new high and the company has no precedent to gauge demand, says Mr. Ashok, now chief executive of mobile software startup UnfoldLabs. That's certainly the case with the \$999 iPhone X. Apple has "never gone there before," he says.



Obsessive design and a smooth just-in-time manufacturing process can be at odds with each other, causing delays. Shown, Apple's chief design officer, Jony Ive, left, and Apple CEO Tim Cook, who is known as an operations specialist, examine the iPhone X after the product announcement Sept. 12. PHOTO: MARCIO JOSE SANCHEZ/ASSOCIATED PRESS

Apple may well be facing its biggest demand-forecasting challenge since the original iPhone. While Apple has empirical data on demand for new iPhones, it's harder to know what proportion of orders will be for the iPhone X versus its somewhat less pricey new siblings, the iPhone 8 and 8 Plus. In addition, many analysts are predicting this could be a "super cycle" of upgraders who have been holding out for a complete redesign—leading to a sales surge like the one caused by the 2014 launch of the iPhone 6.

One reason forecasting demand matters so much is the rise in just-in-time manufacturing. Producing millions of phones means coordinating a symphony of component manufacturers, all delivering parts on demand. These partners can't risk unsold inventory eating into their already razor-thin profit margins. The result is that electronics tend to ship directly from factory to retailer.

Asked about production delays for the iPhone X, an Apple spokeswoman said only that the November ship date was reflected in financial estimates Apple gave in July.

Yet Apple has admitted to being blindsided in the past. When faced with a shortage of iPhone 7 models in October 2016, Mr. Cook said on an earnings call that it was "hard to say" if Apple would meet demand by the end of the year. "It's very hard to gauge demand, as you know, when you're selling everything you're making," he added.

Price of Perfectionism

One of the biggest challenges top-tier manufacturers face in delivering product on time is their own exacting standards, says Mr. Ashok.

Apple is notorious for changing small but important details of its final hardware designs more or less at the last minute. That perfectionism isn't unwarranted, since hardware can't be revised once it's in the hands of the consumer, and the cost of recalls, such as Samsung's Galaxy Note 7 battery fire fiasco, can be enormous.

Even relocating a single screw can have consequences for the dimensions, placement and performance of dozens of other components, says Chetan Sharma, a mobile-industry consultant. Details like this can be worked out in advance given enough time, but in the cutthroat mobile industry, time is something even Apple doesn't have. A

yearly refresh of its phone line leaves only a few months in each design cycle to bring a device out of the lab and onto the factory floor, Mr. Sharma says.



An employee worked at Lens Technology, based in China's central Hunan province, in a March 2015 photo. The company supplies Apple, Samsung and other tech giants with touch-screen glass. PHOTO: AGENCE FRANCE-PRESSE/GETTY IMAGES

When a company brings in new tech—such as the iPhone X's OLED display, not seen in any previous iPhone—the headaches multiply.

“Yield” is the percentage of a batch of components that meets production standards. Yield is the enemy of first-time technologies, says Wayne Lam, principal analyst for smartphone electronics at IHS Markit .

“On the original iPhone, yield rates for capacitive touch [screens] were like 80% because it was new technology,” says Mr. Lam. Throwing out one in five displays means absorbing a huge cost, he notes. (Apple's touch-screen yields have since risen, he says.) Other challenges to yield include factory-worker training, since most final assembly of phones is still done by hand.

Global Shortages

Sometimes, a component is scarce at any price. Nearly every smart gadget you can name contains NAND memory, which retains data when powered off. This key component has lately faced a global supply crunch.

“It's sort of like OPEC,” Mr. Lam says. Just as refineries will contract with oil companies years in advance, giants like Apple will make deals for enormous quantities of NAND memory, squeezing out smaller players. Nintendo has blamed booming smartphone demand for a shortage of components needed to make its Switch gaming system.

Even Apple can't get around what may be the most critical bottleneck for the iPhone X. At present, analysts say, only one conglomerate can manufacture that OLED screen—and it is Apple's biggest smartphone competitor. Granted, Samsung Electronics' visual display business is separate from its mobile business, but Apple appears to be trying to bring in other partners to make OLED displays, including Japan Display Inc. and LG Display.

Manufacturing smartphones is so complicated, it's a minor miracle they get to us at all. Companies control whatever they can by pre-announcing products, collecting pre-orders, stoking demand and when necessary managing expectations. They even ponder how much scarcity may increase desire—so that when the product does arrive, weeks or even months later, it feels like it was worth the wait.

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Apple's iPhone Event

- Apple Gambles on Premium Pricing
- Can Apple Unlock Promise of Facial Recognition?
- iPhone X First Look: About Face
- iPhone 8: Apple's Middle Child
- X vs 8: How the New Phones Compare
- Watch Is Unleashed from Phone
- Can Apple Stem Slide in China?
- Wall Street: iPhone X 'Did Not Disappoint'
- 4K Movies for \$20? Not From Disney
- Event Shows Off Steve Jobs Theater
- Android's Best Phones Raise Bar

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