Digital product upgrades: Beware of imposing learning costs on users

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Companies which are seeking to capture value from their digital innovations can do so by constantly releasing improved versions of their current products. But there is a 'dark side' to this sort of strategy: the

upgrading of products may alienate customers who have already invested a great deal of time and effort in getting used to a particular operating system.

A 2021 study by a Singapore Management University (SMU) professor and his co-researchers, titled "Growing Pains: The effect of generational product innovation on mobile games performance," has implications for our understanding of digital transformation in general, as digitizing production processes and business models inevitably involve upgrades and iterations.

Digital transformation brings benefits as iterating software is much less costly and faster than upgrading hardware (for example, a car's operating system as opposed to the car itself), but it also shows that the iteration process may have a downside.

The study, by SMU Associate Professor of Strategy and Entrepreneurship Chen Liang and his co-researchers, found evidence of a dark side, which can be particularly damaging for firms which initiate numerous changes. This negative effect, though, does not tend to be so damaging for market leaders.

The paper argues that while product upgrades—referred to as "generational product innovation" (GPI) in the article—are released with the intention of capturing value, "they may also impose learning costs upon customers which can be value destroying."

Citing previous studies, their paper points out that "scant attention has been paid to the changes that innovations may impose on customers and the fact that customers may have natural resistance to such changes."

Although product upgrades are deployed within a wide range of industries, the study focuses on mobile app games in particular, in part

due to access to data from 58 countries held by an analyst firm in the mobile intelligence sector.

The paper states that for developers of these apps, "generational innovation is a ubiquitous and important tool in firms' arsenal."

"Iteration is something app developers talk a lot about, but not something—at least in our field, in strategic management—people really pick up on," Professor Chen told the Office of Research. "Whenever we spoke with practitioners, they always felt iteration is what they do every day. They try to keep improving their products based on users' feedback and new tech trends in the market."

The researchers conducted interviews with several app developers, with one describing upgrading as "a question of life and death for a mobile game, because users would get bored playing the same game within a month. The best way to survive is to update new content regularly." Another developer stated that major updates "have the highest potential to generate revenues."

Professor Chen told the Office of Research that "innovators want to make sure, whenever they launch a new innovation or new product, they get to make money out of it." While that usually involves intellectual property and copyright protection, software development has some unique challenges due to the speed of innovation in the sector.

"It's pretty hard to patent a piece of software," Professor Chen said, adding that as many software companies are small-scale studios, they lack the resources of large manufacturing firms and are unable to hire lawyers specializing in intellectual property. In any case, the industry changes so rapidly that "by the time you get granted a patent, it will be some two years down the road" and, by then, the software or app may have already lost its appeal.

"One main mechanism for value appropriation is simply to iterate faster than your competitors, so you're always ahead of the game and able to make some money out of it, even if just for a short window of opportunity. But there is a potential cost we need to be aware of." For instance, the article quotes a Snapchat spokesperson, who told CNN that a major product upgrade "can take a little getting used to".

"The issue is that whenever you introduce new features and functions to make it more fun for the gamers, you actually make some of their competencies and skills irrelevant at the same time," Professor Chen said. "So, they need to re-educate themselves and re-establish a set of routines to outcompete other gamers. And that's the sort of cost we're getting at."

The study's methodology employs a difference-in-differences (DID) approach. "So, essentially, we're comparing twins, by looking at two very similar products. One app gets a major upgrade, the other—which is very similar in every other respect—doesn't. And then we compare the performance."

"After speaking with practitioners—and based on our understanding of digital innovation, it's likely that apps which have performed badly are more likely to be upgraded because developers want to revive the app. So, if true, you should find some kind of correlation between getting upgraded and the performance."

The researchers in effect compared the performance of almost identical apps, although the upgraded version may have been released first on a different platform to the previous version. "This is quite similar to medical studies in which they compare twins. The assumption here is that twins are pretty similar in many ways. Genetically, in the way they look, their upbringing and so forth. And one of the twins gets some kind of treatment, whereas the other one is in a control group. Then they

compare the outcome to assess the effect of that treatment."

"So, for us, it's the same. We look at the same app on Android versus iOS. Two different marketplaces, but the same app. And the good thing is that the timing of a major upgrade isn't always the same for exogenous reasons. Sometimes approval time in iOS takes longer than for Android, sometimes it's the other way round and it's pretty random. So, we take advantage of the variation, which is beyond the control of the app developers themselves."

"We only look at the performance of the app that receives the major upgrade and compare that with the same app on the other platform. And for the one that was upgraded, you'd expect some kind of change, whereas the app that didn't get upgraded, its performance wouldn't change a lot as nothing had happened to it."

Based on the study then, what would be his advice to software firms producing these apps?

"There's clearly a long-term benefit to generational innovation for companies," Professor Chen says, "but from the users' point of view, at least in the beginning, they probably would become overwhelmed by short-term costs or adjustments. They need to tolerate these and not become overwhelmed, otherwise they'll probably ditch the app before realizing any long-term benefit."

"So, the issue here is that it creates a window of opportunity for competitors to take advantage of. Whenever you release a major upgrade, that will hurt your performance in the short term until users feel the benefits outweigh the costs."

"Products have lifecycles, as does generational innovation. So, the issue here is that it's a bit like the innovator's curse. The more you innovate,

the more likely it is you'll get exposed to risks. And your competitors might be able to take advantage of this and gain more users from you by releasing promotions, just as your users are experiencing disruption."

That said, however, there may be some moderating effects when it comes to games developed by market leaders. "Users still experience a decline in performance but they're probably more tolerant. They want to stay in the game because it's popular."

Professor Chen says that, following the publication of the paper in the *Strategic Management Journal*, he and his co-researchers are examining the interaction of upstream suppliers of chips, cameras and so on, with downstream software developers.

Provided by Singapore Management University

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