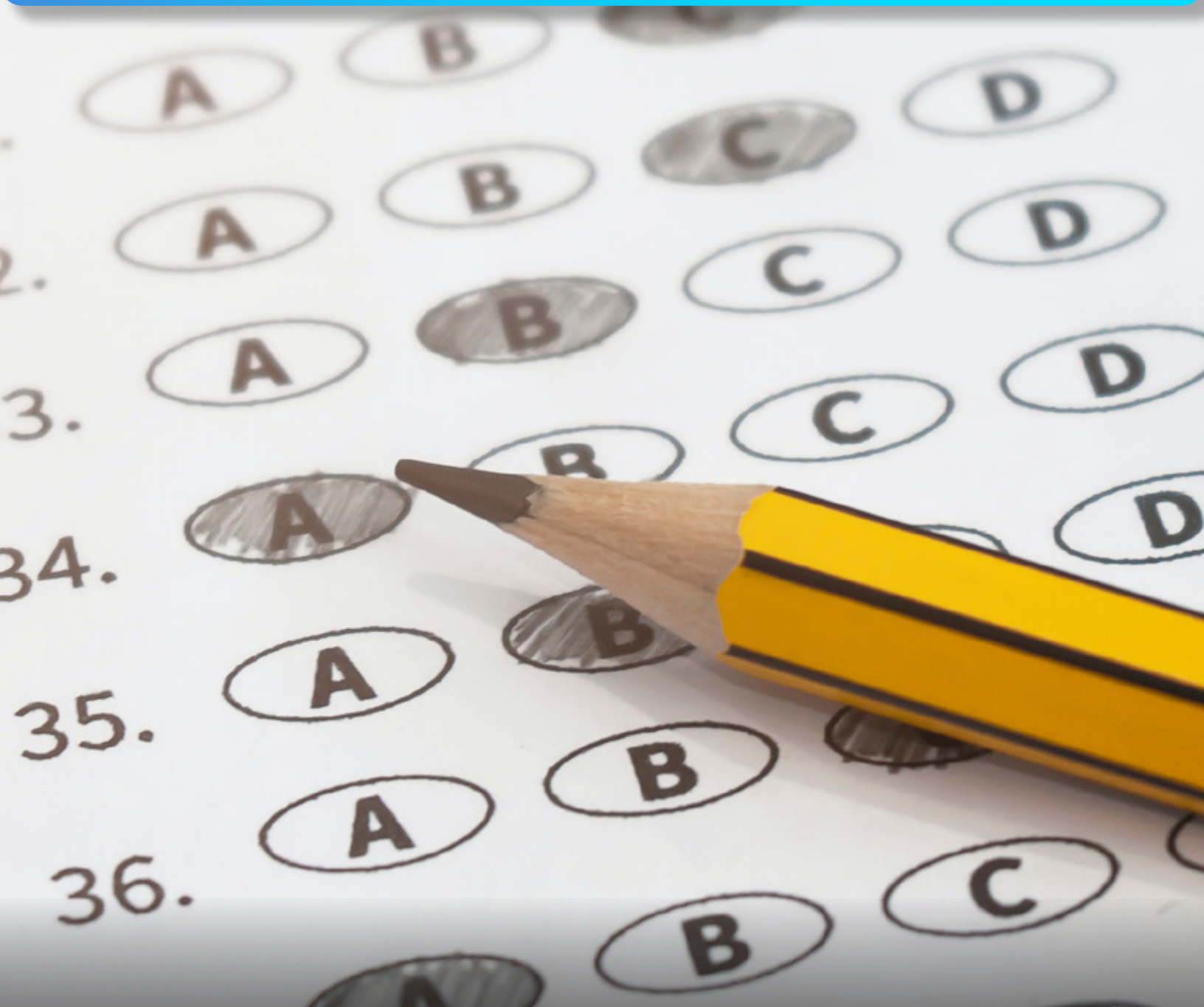


PLATFORM ECONOMICS: RECENT FINDINGS AND FURTHER QUESTIONS



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By Dr. Christophe Carugati



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By Daniel F. Spulber



MARKET POWER IN SUPPLY CHAINS

By Diana L. Moss



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By Dirk Auer & Lazar Radic



PLATFORM ECONOMICS: RECENT FINDINGS AND FURTHER QUESTIONS

By Alexander White



DIGITAL TRANSFORMATION, RETAIL AND REGULATORY CHALLENGES IN MEXICO

By Maria Andrea Latapie Aldana & Natalia Patricia Patiño Espinosa



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By Alexander White

How is platform competition different from regular competition? The first part of this article reviews recent findings from theoretical platform economics. It describes two novel ways in which more competition among platforms has been found to be potentially harmful. It then discusses results on two potential antidotes: multi-homing and interoperability. The second part of the article raises two issues facing the governance of platform industries and argues that they deserve further attention. The first is a distinction between standard network effects and “spillovers,” and the second is on the challenges of regulating firms that are, by their nature, outliers.

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I. INTRODUCTION

In textbook economics, a standard lesson is that monopoly is inefficient and adding competitors improves the situation by lowering prices and providing consumers with more choices. In industries with network effects, which are a key feature of platform intermediaries, it has long been recognized that it is not so obvious whether competition has such a positive effect. After all, unlike the fictional world of “perfect competition,” in which the presence of many suppliers leads to zero markups and maximization of total surplus, when network effects are present, there are obvious benefits to market concentration. For example, when hailing a ride using your smartphone, you would probably prefer having all potential drivers in your area appear on a single app (e.g. Uber or Didi) to having them be spread out across 50 or 500 different apps.

Theoretical work in the economics of platforms has produced a set of findings that help clarify what forces come into play as platforms compete. In this short article, I first review four of the more recent findings that seem particularly of interest. The first two highlight possible mechanisms that could lead competition to either raise prices or, ironically, help reinforce the position of an already-dominant platform. The third involves the potential role of so-called “multi-homing” in restoring the benefits of competition, and the fourth focuses on the potential for interoperability requirements to help improve outcomes for users.

After discussing these findings, I then turn to two issues facing the governance of platform industries that I believe warrant further attention. The first of these issues is the distinction between a standard view of network effects and what I call “spillovers.” By this latter term, I mean situations where the adoption of platforms by some people has a negative effect on others who have not adopted them. I argue that the significance of this distinction between network effects and spillovers may have been overlooked by economists due to a limited sense in which the two are sometimes technically equivalent. The second issue I shed some light on is the inherent difficulty of regulating firms that, in an important sense, are outliers. Here, I briefly consider certain perspectives from the three recent, high-profile reports on digital markets (Crémer et al., 2019; Furman et al., 2019; Scott Morton et al, 2019).^{2,3,4} In doing so, I argue that regulatory proposals intended to foster competition potentially run the risk of stifling innovation by startups.

II. THINGS WE’VE LEARNED ABOUT PLATFORM COMPETITION

A. *The Effect of Increasing Competition among Platforms is Murky*

Here, I discuss two warnings about the effects of competition among platforms, coming from recent research. The first warning is that adding more competing platforms can lead to higher overall prices. This result, which comes from Tan & Zhou (2021),⁵ arises in a setting in which all platforms are symmetric – that is, none is more dominant than any other. The key independent variable is how many such platforms operate in the market. Their model predicts the equilibrium prices that platforms will charge, as a function of the number of competitors. Here, one can think of the price variable as a fairly rough proxy. For example, in the ride-hailing example, it may encompass charges that platforms levy on both riders and drivers. Also, it may include any money paid to the platform, regardless of whether this takes the form of a recurring fee or a per-transaction charge.

The logic behind this phenomenon, which the authors call a “perverse pattern,” is as follows. On the one hand, in traditional industries, market prices are governed by production costs and a single markup term that reflects the level of market power each firm has. This markup term varies positively with the strength of the demand and negatively with the number of competitors. On the other hand, in platform pricing, an additional factor enters the picture, which we’ll call the *scale discount*. The crucial point is that when platforms in an industry enjoy greater scale, i.e. a smaller number of them serve the same number of users, they have an incentive to offer a larger scale discount. Although these basic ingredients of platform pricing were identified long ago, Tan & Zhou offer an approach that allows for a comparison between the relative speeds with which the traditional markups and scale discounts change, as a function of the number of platforms. Using this approach, they find that, theoretically, it is not far-fetched for an increase in the number of competitors to have a bigger effect in reducing the scale discount than it does on reducing the traditional markup. As such, more competition can mean higher prices.

2 Crémer, Jacques, Yves-Alexandre de Montjoye & Heike Schweitzer. *Competition Policy for the Digital Era*. EUROPEAN COMMISSION (2019).

3 Furman, Jason, Diane Coyle, Amelia Fletcher, Derek McAuley & Philip Marsden. *Unlocking Digital Competition, Report of the Digital Competition Expert Panel*. UK GOVERNMENT (2019).

4 Scott Morton, Fiona, Pascal Bouvier, Ariel Ezrachi, Bruno Jullien, Roberta Katz, Gene Kimmelman, A. Douglas Melamed & Jamie Morgenstern. *Stigler Committee on Digital Platforms, Subcommittee on Market Structure and Antitrust Final Report*. STIGLER CENTER, CHICAGO BOOTH (2019).

5 Tan, Guofu & Junjie Zhou. *The Effects of Competition and Entry in Multi-sided Markets*. REVIEW OF ECONOMIC STUDIES (2021).

The second warning is that platform markets can even exhibit entry-induced dominance. That is, the entry of more competing platforms into a market can potentially lead to the dominance of a single platform, or it can reinforce the leading position of an already-dominant platform. This result appears in a recent working paper, Ekmekci, White & Wu (2022),⁶ that two coauthors and I wrote. Our model can identify this phenomenon thanks to its ability to encompass scenarios in which platforms are asymmetric. This possibility, like the perverse pattern described above, owes itself to both the presence of network effects and the scale discount that is present in platforms' pricing.

The key aspect that makes entry-induced dominance possible is that new entrants in a market do not necessarily exert an equal level of competitive pressure against each of the platforms that were already present. Instead, an entrant might turn out to disproportionately siphon off the user base of certain platforms and not others. To take the simplest possible example, consider an industry whose *status quo* involves two equally-sized platforms, 1 and 2. When a new platform, 3, enters the market, a reaction may ensue in which 3 mostly draws users away from 2. The consequence of this is a kind of snowball effect where 1 ends up with a larger market share than it had prior to 3's entry. This is aided by the fact 1's (now) large user base makes it seem preferable to both 2 and 3 in the eyes of the majority of users. This configuration is reinforced by the fact that 1's large size compared to 2 and 3 means that it can offer a larger scale discount.

Note that, purely from the short-run standpoint of users, such an outcome may not be a bad thing. Nevertheless, the possibility of entry-induced dominance merits concern on the part of policymakers, given the broad array of worries associated with tech giants' dominance. In particular, in policy discussions, it is not uncommon to hear it suggested that measures promoting the entry of more platforms could be a good idea in order to tame large platforms' dominance. This result shows that such measures could have the opposite effect.

B. Multi-homing and Interoperability Both Have the Potential to be Helpful

In the above descriptions of both the perverse pattern and entry-induced dominance, a crucial point was that network effects were platform-specific. That is, in the settings imagined in those descriptions, the appeal to users of a given platform depended on how many users were active on *that platform*, not on how many users were participating on any platform operating in the same space. For example, in our ride-hailing thought experiment, the implicit assumption was that it would be inconvenient to live in a world with 50 or 500 similar, competing ride-hailing apps, because, when you went to hail a ride, the different potential drivers would be spread out across the many different platforms. Consequently, none of the platforms would offer a reliable service.

On the other hand, to take an extreme case, if all drivers in your area appeared on all of the many different ride-hailing apps, then, from your standpoint as a user, the situation would seem rather appealing. You would probably not need to check more than one app in order to find a nearby driver. Moreover, you could be confident that competition among the many different apps would keep prices low.

Two different arrangements that partially embody the essence of this latter situation are (a) those with so-called "multi-homing" by at least some users; and (b) those with (potentially mandated) "interoperability" across platforms. Regarding the former, "multi-homing" is jargon used to describe the case where users potentially join multiple competing platforms at once. Although this may seem obvious as a desirable feature for a model to incorporate, it is technically quite difficult to do so in an environment that is not otherwise highly constrained. Nevertheless, Liu, Teh, Wright & Zhou (2021)⁷ make a recent contribution in this area. They develop a sophisticated model in which users of different types (e.g., riders and drivers) all have the option to sign up for any combination of platforms they like. Once users have made these joining decisions, it is feasible in the model for any given (rider-driver) pair to get together for a trip on any platform that they have both signed up for. The authors study, in this setting, the effect of an increase in competition on prices. Although this model is not directly comparable to the aforementioned one of Tan & Zhou, the results stand in contrast. No perverse pattern emerges; instead more competition leads to lower equilibrium prices.

Interoperability across (or "compatibility" among) platforms also has the potential to bring about the same favorable situation, contemplated above, in which all drivers could be found by opening a single app. Indeed, this is roughly how some well-known networks already work, the most obvious of which is telephony. You may get your phone service from one carrier, and I may get mine from another, but our carriers are interoperable. In order to call each other, we don't need to worry about who is signed up for which carrier. In effect, the universal phone numbers that we use to call each other are part of an interoperable system, where, in certain respects, the platforms appear to play a more passive role.

6 Ekmekci, Mehmet, Alexander White & Lingxuan Wu. *Platform Competition and Interoperability: The Net Fee Model*. NET INSTITUTE WORKING PAPER (2022). URL <https://ssrn.com/abstract=3945134>.

7 Liu, Chunchun, Tat-How The, Julian Wright & Junjie Zhou. *Multihoming and Oligopolistic Platform Competition*. WORKING PAPER (2021). URL <https://ssrn.com/abstract=3948799>.

In other, less established platform industries, would it be beneficial if the government were to require platforms to be at least partially interoperable with one another? In the aforementioned working paper, Ekmekci et al. (2022), my coauthors and I address this question and find results that are broadly optimistic, from the standpoint of users. A reason why this is *a priori* unclear is that, although an interoperability requirement opens up a set of new feasible consumption patterns (e.g. you might prefer to sign up for just Zoom and I might prefer to sign up for just Microsoft Teams, but we could still have video conferences with one another), platforms could potentially respond by increasing their prices. Our model, however, predicts that the quality benefits, brought on by the former expansion of connectivity, outweigh, from the perspective of users, any potential price increases.⁸

Both multi-homing and interoperability are thus decidedly important factors to consider when trying to understand the behavior of platform markets. To some degree, the point about multi-homing has a more positive flavor, whereas the point about interoperability has a more normative one. This is because, on the one hand, some industries (e.g. ride-hailing) seem to give rise more naturally to widespread multi-homing than others (e.g. which type of mobile device to use). On the other hand, interoperability is typically spoken about as a regulatory proposal. Nevertheless, there is some overlap. For instance, ride-hailing platforms have, at times, demanded drivers sign agreements to drive exclusively for them and not competing platforms. The research described above suggests that, to the extent an authority relies on competition as a means to discipline the prices charged by such apps, it would also be well served to prohibit such exclusivity demands. Regarding interoperability, a limiting factor of our understanding so far is the degree of abstractness currently needed in order to model this issue. Further case studies on what such regulation might look like in practice in particular industries would be very welcome. As the final portion of this article argues, such regulation is not without its risks.

III. TWO ISSUES THAT DESERVE ATTENTION

A. *Spillovers may be Important and have Different Implications from Network Effects*

An aspect of platform markets that deserves more attention is the distinction between classic network effects, which directly affect only platform participants, and another type of externality. These other types of externality are those where the presence of many users on a platform or a set of platforms influences the well-being of nonparticipants, i.e. people who have not (yet) chosen to use the platform(s) in question. For the purposes of this discussion, let's call the former type of externality "network effects," and let's call the latter type "spillovers." Just to be clear, on the one hand, a situation purely exhibiting network effects would fit the following description: compared to a situation in which LinkedIn didn't exist, Alice finds it affirmatively preferable that it does exist, so long as she and her extended professional network also uses it. On the other hand, a situation purely exhibiting spillovers would fit this more Luddite description: Alice sure did prefer life before LinkedIn existed, but if she receives a few more email notifications from it regarding her professional acquaintances, she might bite the bullet and join it herself.

From the standpoint of economic theory, within a limited scope, these two types of scenarios are, in fact, equivalent to one another. In particular, when it comes to issues such as determining what prices arise at equilibrium and what prices are socially optimal, basic economic intuition correctly leads to the view that it's unnecessary to pay attention to the distinction between the network effect scenario and the spillover scenario. From a mathematical standpoint, the only difference is whether you set the problem up by putting a particular term on the left side of an inequality or on the right side. Regardless of which side you choose, the answers will be the same.

However, beyond a particular limited scope, this distinction becomes substantial. A specific question for which this distinction makes an important difference is the one of how much investment is socially desirable in a particular platform industry. Within a particular class of models that are equivalent to one another with respect to the above-mentioned pricing questions, one that exhibits more network effects and fewer spillovers would optimally call for more expenditure on fixed costs than one that exhibits fewer network effects and more spillovers. To put it another way, in the former version described above, in which people like Alice affirmatively benefit from LinkedIn, there would be a stronger argument for resources to be devoted to the market in which LinkedIn competes, compared to the latter version, in which people like Alice join by necessity merely to keep from falling behind.

To the best of my knowledge, little effort has been made to understand or measure the extent to which various platform markets fit the former network effect scenario versus the latter spillover scenario. From my perspective, it appears that, by default, standard models of platforms adopt the former specification, whereas casual observation suggests that a healthy dose of the latter scenario is not unrealistic. It seems plausible that, among platform economists, the equivalence of the network effects scenario and the spillovers scenario in some contexts may have caused some questions that depend substantively on this distinction to be overlooked.

⁸ Note that, unlike the work of Liu et al. (2021), which suggests that multi-homing makes competition more beneficial than it would otherwise be, in the current version of our work, we study just the direct effect of requiring interoperability, not its interaction with changes in the number of competing platforms.

B. *Regulating Outliers is Tricky*

A second aspect that deserves recognition is that the most successful platforms – and the ones that raise the most antitrust and regulatory concern – are, by their nature, outliers. In other words, any of the platforms that are now household names became that way because they were highly exceptional, at some point in their history, at setting off a process in which they attracted millions of users. There is no surefire recipe for a nascent platform to be able to do this. Instead, achieving mass adoption takes some combination of innovation and experimentation in many different unpredictable dimensions, relentless execution, and luck. This aspect presents the possibility of a tradeoff, which I'll describe here, that may have bearing on attempts to govern platform markets.

Summarizing very broadly, each of the recent, high-profile reports on big tech platform markets (Crémer et al., Furman et al.; Scott Morton et al. *Op. cit.*) distinguishes between competition in the market and competition for the market.⁹ Roughly speaking, the former refers to a more plain-vanilla form of competition where different suppliers compete on somewhat even footing in a given market. The latter refers to something like “potential competition,” under which dominant incumbents face the possibility that they may at any point be displaced by an innovative startup.¹⁰ At the same time, the reports are generally sanguine about the prospect of regulating platform markets. Possible modes of regulation include requirements for interoperability, whose theoretical benefits are lauded above in this piece, and portability, designed to make it simple for users of one platform to switch to another.¹¹ Furman et al. (2019) also propose that the largest platforms be subject to what they call a “code of conduct.”

An apparent feature of such regulation seems to be an attempt to codify platforms' activity by defining what their crucial dimensions are. This raises the question of whether well-intentioned regulatory attempts might, by doing so, foster an environment that turns out to be favorable to incumbents rather than to innovative startups, whose potential for success depends on being able to innovate in unpredictable dimensions. Observably, incumbent platforms seek to play a role in influencing the way their industries are regulated. Undoubtedly, in exerting any such influence, they face an incentive to try to reduce the kind of unpredictability that might be crucial to startups' prospects. In view of this, it would be useful to have further examination of this potential tradeoff between, on the one hand, encouraging less friction in platform markets and, on the other hand, preventing them from becoming ossified.

IV. CONCLUSION

In this article, I do two main things. First, I review four notable results from recent research on platform competition. The former pair of these results are more pessimistic about the effects of competition itself, and the latter pair are more optimistic about the role multi-homing and interoperability can play in the markets where platforms compete. In the second part of the article, I raise two questions regarding platform markets that I argue deserve further investigation. The first question regards the distinction between classic network effects, in which platform users have a positive effect on one another, and “spillovers,” whereby platform users exert a negative influence on non-adopters. Here, I argue that a limited technical form of equivalence between these two types of situations may have led us to ignore substantive implications of spillovers. Finally, the second question I raise regards the challenges of regulating outliers. I argue that there may be an important tradeoff facing regulation in environments where (a) a crucial disciplining device against dominant firms is potential competition from startups *and* (b) startups' ability to credibly fulfill their role as potential competitors depends on their having leeway to execute complex, unpredictable strategies.

9 For more on this distinction and its role in these reports, see: White, Alexander and Baiyun Jing. *Platform Economics and Tech Giants: Competition in the Market Versus for the Market and the Implications for Regulation and Merger Policy*. BEIJING CAIRNCROSS ECONOMIC FOUNDATION (Forthcoming).

10 Competition *for* the market has some resemblance to theories of “contestable markets,” which gained prominence in the 1980s.

11 As with interoperability, various countries' telephony markets provide an easy-to-understand example of portability, with regulation requiring carriers to allow users to keep their same phone number when they switch to a competitor.



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