BEAUTY OF PLATFORM AS A SERVICE : NEITHER READY TO USE NOR BARE BOXES

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ISSN 2277-7733
Volume 9 Issue 1, June 2020

Abstract

Information Technology has occupied substantial space in our day to day life and in running of businesses. How does society regulate I T providers especially when they operate across the globe, beyond the control of nation-states. How do we balance rewarding tech companies for their innovation, and possibility of unfair exploitation, particularly where I T services are 'free'. 'Free' services are 'paid' by consumers by their time, attention and data. This paper examines possibility of promoting use of Cloud computing technology Platform as a Service (PaaS) by regulators as a means to catalyse competition and curb monopolistic power of I T service-providers.

Keywords: *PaaS, Laws for Cloud Computing, I T monopolies, Anti-trust in Infotech.*

Like the war is too important to be left to generals, by now the information technology is too important to be left to tech-titans and techno-entrepreneurs. Society and lawmakers have to get actively involved. Books needed copyright laws, air travel needed passports, and telephones needed rules for interconnections. Does I T need anything special?

Cloud is a clear paradigm shift. Open your laptop, tablet or mobile and get working, for your personal things, your job,as a consumer or citizen quite effortlessly. Press the switch and you get power, let the electricity company and city take care of everything behind the switch. Does this happen with your data and software or apps? Does it throw new challenges? Fundamentally, clouds come in three flavors- Infrastructure as a Service (IaaS), where Cloud has most basic functions and the user does the rest; Software as a Service (SaaS) a plug and play model where cloud has everythingand something in-between called Platform as a service (PaaS).

Tech neutrality has been talked about extensively. While the concept appears pristine simple and attractive, complexities do arise in working out details, particularly in cases where legally binding definitions are needed. For instance, net neutrality could be strong or weak (Gans, 2015). How neutral is neutral enough, and what is an appropriate balance of interests is the moot question.

Notwithstanding complexities, the intention of society and polity is to create a level playing field so that innovation is awarded, and we distinguish Knowledge and Know-How. Knowledge is available freely. This is an underlying principle in recognizing patents and copyrights. Drugs are patented, but can you imagine a language getting a patent? Every hour you write or speak in English you may give 0.01 cent to someone. In a democracy, theSociety intervenes to break monopolies, thru means such as anti-trust laws. Genuine competition-the invisible hand- brings efficiencies in the marketplace resulting inthe common good.

Big technology companies have huge money muscle, and most valued tech companies have more financial clout then every country other than likes of the US and China. They also wield great capacity to influence, not only business, but also thinking, and

development of personality (Kavitha, 2019). Of course, they have earned the place by providing service we all wish to use, so their money power is a reward for the capacity to invent and create, but can it lead to unreasonable gains? An intangible- technology- has so much importance, probably for the first time in human history. Another first is doing business without physical presenceand contact, reducing the ability of a nation-state to control tech giants.

The question we face is: What is the best way to strike a balance between allowing a tech business to reap the benefit of their efforts and strategy and emergence of 'brave new world' of I. T. monopolies controlling our minds and actions. Is there a possibility of a preference for a broad technology choice, which strikes the best balance?

Now, let us examine the three options: IaaS, SaaS, and PaaS. (ibm.com, 2020) IaaS is by the techies, for the techies. Buyers and Sellers understand the product, the technology is evolving but reasonably mature, market logic of competition and cost-benefit can bring in required efficiencies. IaaS uses anytime, anywhere power of the internet to share resources. It is essentially rent rather than buy model for tech resources; akin to downtowners preferring to use taxis, rather than buy cars; wherein providers gain the ability to get better utilization, by selling idle resources to another customer.IaaS a business-to-business phenomenon, does not raise major societal issues. Full ownership of all resources is always available as an option to a buyer, and this option places a natural ceiling on the price a provider can charge for IaaS facilities. IaaSrepresents continuity in some sense; we had faster and faster computers, now we have a better sharing mechanism, for benefit of technology users.

On the other hand,SaaS is for the consumer. Choice and cost-benefit payoff, as seen by the decision-maker were always drivers for commercial transactions. We paid dollars for everything! Technology is now ushering a new market where we do not pay in dollars and cents, but pay by our time, attention, and data, sometimes without fully realizing how the payment is being done. We choose to join a group and by virtue of joining, and using a service, we inadvertently support one tech option over others. Joining expands the group and gives it a larger base, possibly larger share, and a larger voice to attract others and spread costs to a larger base, with zero or near-zero cost for serving additional consumers. Success breeds success and more success. It will keep booming until the disruption happens by a totally novel technology, or, a superior concept. You may choose to join, sometimes because you do not have time or energy or expertise to find the best option. There is an inherent comfort in numbers and after the initial critical mass,the popular choice may not always be the best option!

The beauty of SaaS is customer can use rich software without the need to do any learning, somewhat like putting on your fan, rather than driving. Many offerings of 'free' software are structured as SaaS.The danger of SaaS can be an imbalance of millions of individual consumers, each with a small stake, drawn by attractive offerings and the presence of her friends, 'buying' from a highly sophisticated technology provider, possibly with large financial muscle. Entire structuring- for example, what all data consumers should provide to use the software- is done by the

tech company, and 'fairness' of the price depends on the good sense of service provider, given the near-monopoly situation for many, at least, some services.
PaaS may have the potential to offer level playing field and induce competition, and garner market forces to ensure fairness in the pricing of services, and the possibility of self-regulation by knowledgeable players, while providing good services to a multitude of lay or disinterested customers. In the broadest sense, the platform will be the responsibility of techies, with insight and wherewithal to harness the power of technology, whereas consumer interface will be built by either smaller, perhaps local front-end service provider, or by larger consumers for themselves. PaaS may present options similar to a sturdy chassis, and fully working engine available for customized bodybuilding for your car, semi-processed food with a choice of final dish done by Chef to taste of diner, Lego of various colors and size available for building almost anything you fancy, wooden boards and blocks designed to fit and assemble a large variety of furniture, etc.
Is there a case for society to encourage PaaS over IaaS and SaaS? And if so how? IaaS is bare-bones infrastructure, far short of what consumers can relate to; and SaaS can result in very inflexible take-it-or-leave-it offering with fears of tendencies to curb competition and possibility of tech providers turning into monopoly 'utilities' with the need for regulation and monitoring. Utilities provide a fascinating scenario of the societal struggle of determining the ownership and extent of regulation, identifying ways to generate competition in an essentially monopolistic situation, and restricting private ownership in strategic areas. Utilities regulations have been altering and evolving (Clifton, Lanthier and Schröter, 2011)and may provide useful lessons for dealing with hi-tech industry.
Platform as a service offers a combination of structure and flexibility, and this uniqueness of PaaS makes it an attractive option. This uniqueness, noticed by both scholars and practitioners (gartner.com, arxiv.org 2020) is one of the key drivers for growth of PaaS.
PaaS has scope for built-in competition at two levels- Platform offering competing with one another and final software done by front-end service providerfor consumers, competing with similar offerings on same or different platform, with market forces bringing in price and product efficiencies, and avoiding fear of emergence of monopolistic behemoths.In other words, this chain has two links, the first is platforms selling to front-end service providers, and the other is front-end service provider selling to consumers or consumer product companies.Front-end service provider, with the capacity and commercial interest to evaluate platform and choose the most cost-effective one, will ensure that competitive forces prevail in the platform offering. Consumers will get to choose from multiple offerings, broadly meeting the requirements and depending on the volume, possibility of getting it customized to their own needs or preferences. Gaps- in say geographies served or functionality catered to- are likely to be filled quickly by entrepreneurs spotting the opportunity. Two sets of competitive forces will bring in market efficiency and keep a check on unfair pricing, and creation of a market with superior market forces as compared to both other possibilities- IaaS and SaaS.

What could be the downsides? Big providers may claim that their know-how is not shareable and they can be effective only if they interface with the ultimate consumer, using SaaS model to offer their services. They may even argue that to recoup the cost of technology used they need control over the entire chain. Data available toservice provider can be instrumental in 'knowing' the consumer, for running analytics resulting in better targeting of service. Businesses can benefit by 'selling' data with the consent of the consumer and in the worst-case scenario without the consent of consumer.

Let us try to look at the details when we have multiple players involved. Who will own the data and where will it be stored? Just to illustrate, a cookie is stored on consumers' computers but is really owned by the software service generating the cookie. There would be a need to share the data between front-end service providersand platforms and possibly a need to share data across platforms, akin to telephone calls seamlessly getting routed from one telephone company to another.

What could be possible models for data gathering, storing and sharingto facilitate superior services, for instance, targeted service based on customer profile, but avoiding monopoly of data in hands of some tech companies. The proposed market dynamics of two link chain is likely to push entity closer to consumers- front-end service provider-to store data, whereasplatforms- the core technology providers- will determine the data elements. The involvement of two players itself will curb the tendency for monopoly.

Let us now consider how to catalyse preference for PaaS. Society and legislators have carefully looked at businesses developing into a monopoly, and regulators in Europe, United States and elsewhere have examined and acted on unfair dominance. The power of large firms, including those in the Tech sector is a matter of attention for governments. While the current regulatory framework does help in stifling concentration, it may not be very effective in curbing the power of firms(Shapiro, 2018). Ever-evolving nature of technology, the inherent slow pace of legal proceedings, and tightly knit global ecosystem for technology renders such actions difficult and rare. While PaaS may have better safeguards, how can it emerge as the alternative of choice? One possibility is that regulators may indicate their preference in consultative processes with the industry, and their proceedings while examining dominance. Including technology choices ('prefer PaaS') in laws may be near impossible, but incorporating these in codes of conduct and industry norms may be feasible. As long as the markets appear to be open for competition, even a near-monopoly will serve consumers well, to ward off emergence of a competitor.

Fully integrated service, by itself, does not reduce competition (think of an App playing randomly chosen songs, like a radio station), SaaS offerings tend towards monopoly only when user data is exploited. Data is at heart of digital economy, and data collected (age of a consumer) and data observed (behaviour of a consumer on a website) can provide significant leverage to service provider to reduce cost, or, increase service quality. Exploitation of data may involve need to use propriety technologies, and tech companies will be reluctant to share it, especially when the

entire service is 'free' to the consumer, that is consumer pays by her own time and attention, which is of commercial value to the service provider.
Let us look at a parallel. Underlying factor of success of world wide web is a simple, powerful, universal standard for sharing. No one owns it, everyone uses it. It is like English- the world language.A common, widely acceptable, simple standard for consumer data- collected and observed- can be the foundation for the two-layer model, consisting of platform and front-end service provider. As long as possibility of emergence of front-end service providersserving consumers exists, monopolistic tendencies will be curbed. Front end service provider is likely to pay real money (not time and attention!) for consumer data, even if consumers get service 'free'. We may even see platforms sharing data, amongst themselves, with explicit permission of consumer.
Fear of technology autocrats, their money and muscle of ability to influence the population they have, is real. Big tech companies may have acted, in their own belief, very responsibly and without any political agenda, and still, the political leadership may have a very different take. Worst, consumers may be getting influenced, and have no way to influence Big tech companies. Success of democracy depends on elected government to exercise control over most (not all- think global warming) matters important to nation-state and its people, and people exercise control, by electing the government they prefer (sometimes by referendums!). Regulation of I. T. service providers poses a challenge, as they do not need a physical presence to do business. Of course, despite it, governments have taken actions to ensure fairplay and promote competition, specifically amongst I. T. service providers and have indeedframed laws.(gdpr-info.eu, oag.ca.gov, 2020) General Data Protection Regulation (GDPR) of European Union is one of strictest regulations and has resulted in legal disputes with large monetary stakes. Many American states have their regulations with similar objectives, for example, California has California Consumer Privacy Act (CCPA). Our country has its own Competition Act.
As seen in an interesting study (Hovenkemp, 2017) on anti-trust and Information technology, extensive usage of digital goods and growth in use of I T has resulted in two contradictory influences. On one hand, it has elevated competitive practices with greater information sharing, on other hand, it has enhanced chances of collusion and anti-competitive practices.
Legal process may prove to be expensive, cumbersome and slow. PaaS model boosts up a possibility of a local Front-end service provider, present in the country, providing a service that utilizes a global platform. Front-end service provider will understand the culture of the market and will be governed by the laws of country. One attractive option is to mandate this model specifically for I. T. services provided 'free' to all consumers or in other words are paid by user's time, attention and data. Mandate could be in form of laws, or, code of conduct, or, industry norms. Form of mandate may vary from country to country.
Thus, we see that widespread use of I. T. services by lay consumers is ideally served by PaaS model. It facilitates building of an efficient and competitive marketplace. It can be supported by an explicit preference of technology model (PaaS) by regulators, the

global standard for consumer data collected or observed, and a mandate that only a locally incorporated entity will provide free services.There may be a potential for a quantum leap, in promoting competitiveness.

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