

Theoretical Significance of Improvising Market Performance in the Digital Economy

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Abstract: *We are well aware of the fact that the digital economy has considerably and substantially reduced market frictions and has also posed new challenges for efficient functioning of any market. Also in particular, the seaming drastic reductions in cost of search, transportation, entry and reproduction, all have sound and profound implications for the role of platforms, value of innovation and also balance between firm's data needs as well as consumer privacy. Of late there is a proper structure promoting the development of applied digital technology through research based education centres and also international competence centers. Properly creating the conditions for a more reliable and secure process of generating, storing and also using data is the primary basis for protection from the cyber security hazard that which could act as a brake on technology advancement aspects. The research paper reviews some major recent economic research that which sheds light on major issues and also discuss as to how well designed policies on competition, regulation, consumer privacy and IP protection can all improve market performance in the digital economy. The research paper also highlights important implications for encouraging digital entrepreneurship aspects by focusing mainly on institutional, technology as well as local dimensions of context and various other such measures to develop significant entrepreneurial and digital competencies. It also includes policy interventions to develop information and communication technology (ICT) infrastructure, transport and other local distribution infrastructure and other such training opportunities to essentially develop digital entrepreneurs for improvising market performance in the digital economy.*

Keywords: Digital economy, digital entrepreneurs, ICT, Digital technology

Introduction:

Digital economy is sometimes defined narrowly as economic activities essentially in the form of information and communication technology (ICT) which includes the internet, telecommunications, IT services, software and hardware. However, the broader definition of the overall digital economy includes combined value of ICT production and also digital inputs to rest of economy. There are different estimates about the size of the digital economy because of the differences in the definition. Also in 2017, the narrowly defined digital economy accounted for around 6.9% of the overall GDP in the US, 6% of GDP in China and around 4.5% of GDP in the global economy; however based on the broad definition the respective numbers were 21.6% in US, 30% in China and around 15.5% globally (as per 2019 Digital economy report, United Nations). There is no doubt that digital economy is impacting each and every aspect of our lives despite the differences in the definition and measurement. Besides, we consider the digital economy as encompassing all major economic activities that use or are actually facilitated by most of the digitized data, then it can be essentially considered as the entire economy. New digital technology and internet have certainly reduced costs of search, reproduction, entry, transportation unleashing enormous potentials for enhancing economic efficiency and effectiveness. Also at the same time, cost changes raise new challenges for organization of markets mainly because of their profound impacts on role of platform, the value and protection of innovation and also tradeoff between firms overall data usage as well as consumer privacy. The present paper reviews the highlights and insights from some of

the recent studies on significant opportunities and challenges especially in the digital economy pertaining to such issues related mainly to platforms, consumer data and innovation and also discusses on how well designed policies can certainly improve the overall market performance. Growing importance of various platforms and also platform enabled various products/services. Basically a platform is an intermediary for transactions and with the reduction in consumer search cost on the internet one might even think that there is a diminished need for intermediaries. Also, the internet has substantially lowered entry as well as consumer search costs, which certainly has greatly expanded the overall size of markets and besides increased the number of firms a consumer can essentially access. Technology context is also the 'architectural attributes of the underlying technology' that which shape the entrepreneurial/innovational activities of various stakeholders within a given network as seen in various digital platforms and networking technologies. Both institutional context and technology context shape the local context through changing local practices. The institutional context (including government policies) shapes the ICT infrastructure (mobile/internet penetration rates) and other such physical infrastructure (logistics as well as local distribution channels). These aspects in turn affect various choices that businesses make about the extent of digitalization and also product/service delivery channels. Recent research has shown that by coordinating and also guiding consumer search, a search platform can however improve market efficiency. However, it can also be ascertained that a platform may have distorted incentives when it is partially vertically integrity. In guiding consumer search a platform may also perform poorly when product quality is not observable. Also due to network effects and other

such factors, platforms often possess enormous market power and may also abuse their market dominance. Digitalization, of late has greatly increased the value of innovation and also the need for intellectual property (IP) protection. As many digital products have distinctive property of low production and transportation costs this is especially true, hence it is essential and feasible as well as efficient for one firm to serve a large market with innovative product so that innovation becomes more valuable. On the other hand, strong intellectual property rights especially patent protection is needed in order to deter imitation and also provide desirable innovation related incentives. Also the literature on economics of innovation has devoted quite increasingly more attention towards sequential or cumulative innovation where effects of patent policy are very much different from those for a single level innovation factor. Two recent studies that which yield new insights on how patent policy may improve an industry's overall performance in innovation are discussed here.

Review of Literature:

First, Chen, Pan and Zhang (2018) analyze how exactly patentability standards impact the rate and direction of innovation where rate of industry innovation is shown to vary with patentability standard in an inverted U shape. Besides, Chen and Sappington (2018) study the optimal and poignant rule for patent infringement damages in a sequential innovation environment. As values of innovation rise and also costs of imitation fall, IP protection and innovation will certainly play vital role for economic development in the digital age. Furthermore, increase in IP protection and also reduction in search cost may increase efficiency of market for technology giving rise to much more external innovation rather than internal innovation. It is summarily opined that

for atleast three reasons, consumer information collected by firms can also potentially harm consumers. First, firms may well use consumer purchase history to readily engage in price discrimination. Secondly, consumers may generally have an intrinsic preference for privacy issues and hence suffer from the collection of their personal information by firms they are associated with. Thirdly, data breaches can leak certain information which are personal in nature and harm consumers. New insights on the potential trade off have been offered in recent research in economics in protecting data on the optimal design of regulatory policies imposed upon. Today during this pandemic scenario, virtual meeting platforms such as Zoom video communications Inc, Microsoft teams, Google meet etc amidst large declines of the overall stock market are conducting academic conferences and business meetings which are being held online and also have led to substantial increases in stock prices. While having already provided with conveniences before majority of online shopping sites for groceries and online ordering for restaurants are certainly a necessity for many people during this pandemic period. Also one of the common practices is online provision of healthcare services and virtual doctor appointments. Thus it can be interpreted that clearly digital economy has certainly played a decisive and crucial role in supply of goods and services during this ongoing pandemic and it will also continue to be a driving force for economic growth in the upcoming 'new normal' afterwards. Athey and Ellison (2011) and Chen and He (2011) were the early contributors that which explore the role of major platforms as information intermediaries thus guiding consumer search. A platform has a certain number of advertising positions which are made available to sellers through auctions and sellers are placed on the

platform in the order of their bids. With higher quality sellers offering a product, sellers do differ in quality that which is more likely to meet a consumer's need. To visit a seller each consumer must incur a search cost through which the consumer uncovers whether seller's products is a match for him/her. At a higher position on the platform in equilibrium a higher quality seller is willing to bid more because he expects that a consumer searching his site is more likely to find a match and also make a purchase. As each consumer has the same value for her matched product even if it is sold by different sellers set the same price. Consumers also possess the incentive to visit sellers sequentially in the descending order of their positions on the platform anticipating the seller's strategy and also their paid placements. The platform however acts as a coordination device enabling majority of the consumers to search more effectively and efficiently thus finding a match with less expected search cost and in turn also enabling high quality sellers to reach more customers in longer time period. It is also believed that the problem of low quality products and sellers in the online market is related to low entry cost in these markets. Chen and Zhang in their research study opine that under plausible conditions the quality effect certainly dominates when entry cost is low so that social welfare and consumer surplus both initially rise with search cost even though they eventually fall at some instance. This also suggests that in a digital economy, wherein entry barrier is very low for majority of the markets, regulations that which impose entry restrictions could actually improve the market performance. However, the increase in entry costs, possibly in the form of licensing fee, or even a minimum quality standard, a certification of qualifications can certainly matter which can raise the product quality and also boost both consumer value and overall total welfare.

Research Method:

Platforms as major information intermediaries:

To find product and price information consumer often need to incur search costs and intermediaries have long existed to reduce such costs and also facilitate transactions. To quote an instance, shopping malls have traditionally served as intermediaries for many consumers who search for products and services from different sellers. Consumers can access various products and services at lower search costs as transactions are increasingly mediated through internet and digital technology. Suddenly a question arises as to whether lower search costs in the digital economy can reduce the need for intermediaries? In order to answer this question one must recognize that the internet and digitalization have also greatly expanded the market and consumers nowadays also face a much larger set of sellers to choose from. In making intermediaries more valuable for facilitating transactions the market size effect appears to be the dominant force between sellers and products in the digital economy. This has certainly led to the enormous commercial successes of major platform companies such as Amazon, Google, Tencent and Alibaba. Platforms operate in different ways. For instance, Google's search engine provides sponsored links to sellers who win keyword auctions. When consumer clicks the seller's link a seller makes a payment to Google regardless of whether and how much the consumer purchases it from the seller. An online marketplace on the other hand may host various sellers, each of whom could be actually charged a fixed hosting fee of even a commission as a percentage of the transaction amount (Example: Expedia for hotel booking). For independent sellers an online store like Amazon is both a multi-

product retailer and also a marketplace as it sells various products by itself while also hosting independent sellers as an intermediary.

Analysis:

Some of the major challenges and lessons learnt by applying digital economy are as follows:

Experience from developing and also applying digital economy assessments methodologies does point to the following mentioned lessons and challenges:

➤ **Clarifying and also prioritizing objectives:**

The primary objective of assessment became data collection in most pilot studies. Almost all the resources went to tool refinement and also data improvement; little however was left to formulating the new or updating the ongoing digital development oriented strategy. Also assessment data at times was quite confused with strategy.

Ranging from tool development and data collection, to actually building capabilities for assessment, formulating specific recommendations, generating national consensus on strengths and weaknesses and designing digital transformation strategy pilot assessments were aimed at implicit objectives. Also for the tools and processes which are used for assessment purposes the balance among competing objectives have varied implications for the engagement team skill mix, resources and also accountability.

➤ **Securing essential coherence among assessment tools and devices:**

Within the World Bank group (WBG) drawing on pilot assessment experiences, coherence among various digital economy (DE) assessment tools proved to be a key challenge. Various global practices and regions became attached to their own assessment tools. Adapting rapid prototyping and moving towards a standard comprehensive

assessment framework was the original WBG goal that would be adapted only as deemed essential and also necessary to specific country conditions. Critical decision however vests upon determining the boundaries of the digital economy ecosystem. Also a comprehensive coverage of the entire ecosystem would capture key interdependencies within the overall ecosystem and also enhance the economic impact. But however, the scope of assessment may be dictated by the skills, time, data and other such resources that might be available for assessment. Also country leadership may well be interested in specific aspects of the digital economy which might help to determine the focus of assessment tool.

➤ **Addressing the need of poverty and also inequality:**

Digital technologies are likely to contribute to rising inequality unless they are harnessed for inclusive development. Evidence so far suggests and shows that among and within developing countries the aggregate impact of digital technologies is highly uneven (World Bank, 2016). Yet to achieve shared prosperity and reduce poverty many of these technologies such as mobile money offer new and significant opportunities. However, as a central focus for their digital economy strategy none of the sample pilot countries made moderating inequality and reducing poverty. Also at the national and sub national levels, the current assessment tools did not provide any adequate coverage of digital inclusion and income inequality. Also to capture digital related income, gender and geographic disparities current national level assessment indicators are too aggregate. Also assessments often failed to explain the persistence of barriers to suitable inclusion: what actually explains slow and uneven adoption? Also how efficient and effective is current usage in contributing to poverty reduction? Why promising applications for poverty reduction often fail to scale up? What significant mechanisms would be needed to counter monopolistic and clustering tendencies of various digital platforms and digital industries?

Assessments also did not attempt to systematically track and empowerment impact as such of new available technologies. Besides in shaping and implementing an inclusive transformation strategy assessment results were not used to engage poor communities.

➤ **Strengthening country implementation:**

To render judgement on the capabilities of existing institutions to go ahead and implement proposed strategies most pilots did not assess the implementation quality of past strategies. Yet, country experience suggests that the hardest part of digital transformation is the implementation of digital economy strategies (Hanna 2016; Hanna & Knight). During strategy formulation phase successful countries have done the most preparation for the implementation stage. However, digital transformation essentially calls for developing new institutions, mobilizing local ICT services sector, creating new cadres of digital leadership, strengthening digital governance and also including new information and innovation officers (CIOs).

➤ **Promoting local demand and also effective use of local resources:**

In general, assessment indicators did not adequately capture actual adoption rate and also effective use of digital technologies and also in public agencies, small businesses and traditional businesses in particular. Yet, it is seen that the greatest dividends are ultimately realized from diffusion and also spillover of digital technologies into significant key economic sectors and areas. There is significant scope to stimulate public demand for most developing countries for innovative and locally tested digital solutions, especially for those coming from technology SMEs and local innovators. The uptake however is relatively low despite significant strides in providing citizens with government services online. This likely suggests that the urgent need for demand mobilization measures, such as strengthening demand for good government initiatives, retraining civil servants and also promoting digital and media literacy at large.

➤ **Integrating innovation aspects:**

Pilot country assessment of the digital economy is focused mainly on the adoption of the latest technologies. It however neglected to include adaptive, incremental and also bottom-up innovation that which would be necessary for the diffusion of existing technologies and also their fit into new contexts. Also within the public and private sectors assessment of local innovation and entrepreneurship ecosystems did not give due attention that could be scaled up and also integrated into a proper digital economy strategy. Policy innovations and unconventional economic thinking are the calls for the rise of digital economy which calls for exploring new pathways to local value capture and creation. For instance, servicing local markets and also poor communities would often require creating blended digital analog processes. However, assessments should push for likely innovations that which come from the grassroots, beneficiary engagement and cross-sectoral collaboration.

➤ **Integrating digital economy into a country development strategy:**

One of the vital key finding of this review is that digital diagnostic tools made only modest progress in narrowing the gap which exists between digital economy strategies and country development strategies. Also in isolation of country economic development diagnostics digital diagnostics are often conducted and thus also fail to make a clear connection between progress which vests on digitalization of the economy and also progress towards achieving the sustainable development goals (SDGs). Ideally, as digital technologies can offer new options for development strategies the formulation of both the digital economy and country economic strategies should proceed interactively while development strategies may still harness digital technologies for new uses and also innovations. Also the present existing gap between digital development practice and country economic development practice should be bridged. More

progress will however depend upon addressing the underlying institutional barriers that perpetuate the gap existing between development and technology specialists in developing countries and also aid agencies.

➤ **Collaborating across various sectors and also varied practices:**

A whole set of government approach within countries and multi-disciplinary development practices within aid agencies is required for an advancing economy wide digital transformation. Providing a cross-sectoral view of the state of the digital economy is the core objective of a holistic assessment of the digital economy thus enabling the country to design coherent policies and programs and also coordinate aid and investment measures for digital transformation. Besides collaboration among economic sectors and development practices to deliver more integrated solutions to advance digital transformation and thus help countries break their own ministerial and sectoral silos as part of economy wide digital economy assessment is expected.

➤ **Engaging in effective business:**

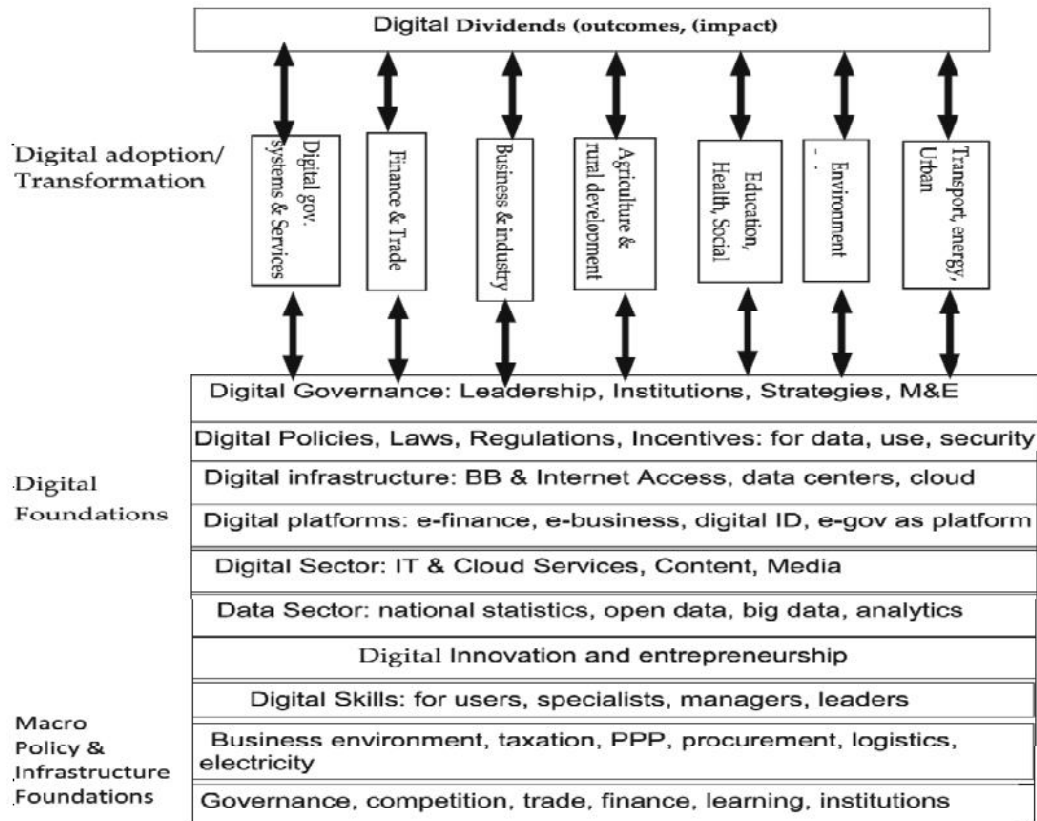
In shaping national digital economy strategy engaging business as an equal partner remains a key challenge for most of the developing countries and aid agencies. Whilst to secure collaboration between the World Bank and its private sector arm significant progress has been made, much however needs to be done to engage IFC in the full cycle of assessment, strategy formulation and implementation and downstream investments. Full and complete IFC engagement in the digital economy would essentially require that WBG prioritize upstream policy reforms that which can unlock opportunities for deployment of private sector solutions in the digital economy. Prioritizing investments in the local digital businesses will also be required that which can strategically contribute to the whole digital economy ecosystem.

➤ **Managing increasing demand and also risks wherever necessary:**

Diagnosis of pilot digital economies on the whole erred more on strengths and opportunities, less on accompanying risks, downsides of digitalization and tradeoffs and also country's capacity for managing these risks. Also insufficient attention has been paid to ways by which digital platform firms exacerbate income inequality and also adversely impact the distribution of the gains. Besides assessments may give special attention to development of local digital platform firms that which can serve local needs and thus capture value and also digital intelligence from local data. It is also critical for developing countries in particular to use the diagnosis to assess the disparate impact of major digital innovations and also indiscriminate use of disruptive technologies on majority of semi-skilled jobs and local capacity to create alternative jobs and skills.

➤ **Attending to proper process, participation and also partnerships**

The process used invariably to assess the digital economy can influence outcomes, outputs, impact and also accountability. As part of promoting ownership and client participation it may be driven by such objectives forming partnerships and coalitions thus developing capacity and institutions and also mobilizing local knowledge in the process. Assessment tools were applied w.r.t pilot studies and excessive attention was given to refining the tools, data collection and also reporting but often at the expense of engendering successful ownership as well as effective use of destined results. The degree of local stakeholder participation in digital economy assessment and downstream strategy development varied quite greatly. To include intermediary institutions little effort was made to influence the composition of local participating team representing small businesses, civil society, trade and professional associations and also poor communities.



Discussion:

Digital Economy Ecosystem

Innovation and IP Protection:

A new product can certainly reach more consumers and also have higher demand as market expands with digitization. However, this potentially increases the value of innovation thus suggesting one possible pertinent reason for apparent acceleration of worldwide innovations in recent years which are measured by number of patent applications. It has been observed that in 2017 innovators around the world filed around 3.17 million patent applications (43% of them were from China) representing an eighth consecutive year of growth. Across worldwide in 2017 there were 13.72 million patents of which around 2.98 million were in force only in USA, 2.1 million in China and around 2 million in Japan (WIPO, 2019). Even though they may require substantial up-front investment digital products

often have low reproduction cost. This also suggests that intellectual property rights (IPRs) can be very much crucial for promoting innovation in the digital economy. How to protect IP rights is a central issue for innovation economics in the digital economy and especially how to design optimal patent policies when innovations are cumulative in nature with current innovations building on past ones. Chen et.al. (2018) in their research study investigate how effectively patent policy, specifically patentability standards may actually affect the rate and even direction of cumulative innovation in an industry where firms can go ahead and conduct R&D in multiple directions. However, if innovation were supposed to be a one-time activity that ends with successful introduction of a new product and also a marginal increase in the patentability standard

would however discourage R&D in the risky direction by actually making it harder to obtain a patent through this direction generating the threshold effect. With challengers conducting R&D that may lead to a follow-up innovation that which actually replaces the current leader if innovation is cumulative a higher patentability standard thus increases the value of being a leader because it will actually take longer before the leader is replaced by a successful challenger. In both innovation directions, this incumbency-prolonging effect can potentially increase the incentive for R&D because challenges will receive higher rewards for succeeding in a patentable innovation.

External innovation through mechanisms such as partnerships, acquisitions, licensing and joint ventures furnishes a larger set of innovation opportunities but may involve higher transaction costs. Search frictions fall as innovation proliferates and IP protection strengthens, the market for innovation and technology transfer becomes more efficient in the digital economy. This has also led to a shift in the pattern of innovation towards external innovation. Companies are increasingly using acquisitions and corporate venture capital according to the study by the Boston Consulting group, companies off late are increasingly using acquisitions and also corporate venture capital to acquire new technologies and ideas from most of the startups and other such external sources. For Instance, while maintaining its lead in networking technology in part Cisco Systems had made more than 175 acquisitions between 1993 and 2016. A total of \$3 billion was paid in total by Facebook for Instagram and Oculus VR. Gilead sciences \$11 billion acquisition of Pharmasset was indeed pivotal for the development of breakthrough treatments for hepatitis C. Today some of the largest technology companies have fuelled their growth through acquisitions. To quote an instance, between its founding in 1998 and January 2000, Google made almost 240 acquisitions. Especially when the acquisition of innovation from a potential rival negatively impacts competition due to the increased

importance of external innovation is not without concerns and controversies. The Federal Trade Commission in February 2000 issued special orders to five major large technology firms, Alphabet (including Google), Apple, Amazon, Microsoft and Facebook requiring them to provide vital information about prior acquisitions if any not reported to the antitrust agencies. Besides the issue of how strict antitrust restrictions should be on acquisitions in innovative industries is actually more complicated. Startups are actually driven to innovate and are also able to receive VC funding partly mainly because there is the prospect for them to be acquired when they actually succeed in investing themselves in risky operations. Also restrictions on acquisitions could adversely affect the innovation incentive by majority of startups. For economic researchers and policy makers the design of policies that both encourage innovation and promote competition remains a challenging task.

Consumer Data and Privacy Protection:

Gathering and storing data is a central part of the digital economy which includes digital technologies. We have also witnessed an exponential growth in recent year's w.r.t digital data over the internet. Global internet protocol traffic which is a proxy for data flows has grown quite dramatically from 100 GB per day in 1992 to around 46,600 GB per second in 2017 and is also expected to grow to around 1,50,700 GB per second in 2022 (as per 2019 Digital economy report of United Nations). Firms off late have greatly expanded their use of artificial intelligence, big data analytics and digital platforms to develop new products and also serve consumers. Accesses to data and also capability to utilize data have become very essential for the competitiveness of firms in the digital economy. Growing ability of firms to analyze and also process massive amounts of data in a particular is crucial to the developments in artificial intelligence (AI). In areas such as voice-recognition, automation and robotics AI is already in use. AI will make self driving cars a reality such as Tesla for now together with new

technologies such as 5G and new computational power. It has been however estimated that AI has the overall potential to generate additional global economic output of around \$13 trillion by 2030 contributing an additional 1.2% to annual GDP growth (2019 Digital economy report, United Nations). To learn about consumer preference firms have been developing innovative marketing methods. While it can be ascertained that some of these efforts do enable firms to serve consumers better the private and social incentives generally differ for marketing innovations that gather consumer information (Chen, 2006). Hence there is a need for regulation on the collection and protection of consumer data. The strong regulatory protection of personal data never comes without cost. To serve customers it may reduce firm's incentives. For instance, immediately following the implementation of GDPR, almost more than 1000 US websites blocked access from European visitors. With the liability from non-compliance apparently firms are concerned which may motivate them to reduce output or even in later stages exit the market. For data protection firms will also incur additional costs in order to comply with the regulation which can in later stages also lead to decrease in output. Competition policy is one of the major interactions for consumer data protection. For instance, a major company such as Amazon sells products and services by itself and also by independent sellers on its online platform. From independent sellers, Amazon can obtain sales data and may also potentially use such available information to gain an unfair advantage such as placing its own wholesale orders for a particular product after the marketing efforts by an independent seller has made the product quite popular thus adversely impacting competition from that of independent seller. How data affects product innovation is another important issue concerning policies on data and privacy. However, one concern is that strong privacy protection will certainly hinder firms overall efforts to learn about consumer preferences and also to the extent that such information is very much quite often needed for product innovation,

regulations on consumer privacy protection will also impede innovation. Also, to share information privacy policy can impact one's willingness. If consumers in particular believe that there is a strong privacy protection, they are more likely to permit the use of their information by firms. For firms to commit to strong protection of consumer data stringent privacy regulation can be imposed which leads to more information sharing from consumers and in turn acts as a conducive to innovation.

Conclusion:

Today certainly digital technologies and internet have profoundly changed the way markets function. Drastically reduced costs on search, reproduction, transportation and entry offers tremendous new opportunities for higher market efficiency. Also most of the developing countries are under immense pressure due to current pandemic and also global economic recession and most of them are also heavily indebted and facing climate change disruptions. Thus diagnosing the digital economy, prioritizing policy and institutional reforms and also building the digital enablers have certainly become more critical than ever especially in poor and heavily indebted countries thus paving way for sustained digital economy. The current situation in this regard calls for quick learning and responses, fast learning and also innovative and holistic solutions to help countries accelerate their digital transformation. Yet it is believed that building digital economies is a marathon and not a sprint. This also calls for sustained engagement from local leaders and other aid agencies. The increasing importance of various platforms, Innovations and consumer data certainly poses new challenges on effective competition aspects, IP protection and consumer privacy in the digital economy. The present review in this research paper identified significant opportunities for various countries and also aid agencies to learn to quickly diagnose the emerging digital economies, device whole of government and whole ecosystem implementation mechanisms, develop coherent digital transformation strategies. To address what future does they want countries may view the

opportunities beyond these multiple crisis and also harness the digital revolution to realize promising dividends in areas made clear by these crises. Countries may also harness their digital economy to reduce poverty and inequality and, thus increase their economic, environmental and also digital resilience.

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