The Missing Link in digital transformation: Inclusive Collateral Resources

Gongpil Choi

The overarching mandates for digital transformation require massive interactions among many players. The core plan for digital transformation is unbundling and re-bundling critical components to mesh together with network topology. In reconnecting productive elements, counterparty risks are controllable via the use of collateral. The risk-mitigating role of collateral means that collateral resource topology determines the magnitude of interactions in a network environment. Against rich collateral resources and capability, interactions can be wide-spread and distributed. In contrast, segmented collateral only allows limited interactions. Better interactions among participants in a more distributed network environment do not require legacy institutions' dominant position. The prominence of legacy trust institutions' dominant collateral positions makes interactions around them, delimiting the network effect's scalability. In practice, the reality is a segmented and jurisdictional use of collateral, which dictates the world's financial flow to generate capital flow uphill. Digital transformation requires massive participation of the general public worldwide with seamless value transfer by allowing a level playing field among participants without particular attractors that impact interactions. The legacy system cannot deal with necessary changes because of its inherently biased selection process[1]. If this does not change, all digital transformation efforts will result in a more polarized world with greater potential vulnerability. The tendency for elements to get together also contributes to a lack of diversifying efforts on existing collateral resources, which calls for conscientious counteractive efforts by authorities to allow broad-based interactions on a level-playing field.

Collateral as an Equilibrating New Trust Foundation

In this note, I try to identify the missing pieces in the discussions on digital transformation. For digital transformation to proceed, we need a sustained flow of funds and inclusive participation of the general public. However, it is challenging to engage investors with no clear track records. Some starting move hinges on existing collateral base. As noted,

[1] Incumbents are typically interested in pursuing agenda for their benefits. Centralized motive is hard to ignore.

the inevitable direction for future changes without any necessary reform of collateral foundation calls for a renewed sense of apprehension. Firmer grip by the authorities in place of free private market participation is in the offing. Any changes that are sweeping and fundamental, like digital transformation, require consent from all society members. Everywhere we observe "new elephants in a room" with an even bigger central bank footprint, which is used to show dynamic interactions among market participants. The scope of social consent is related to trust level in any specific category, e.g., real estate or any financial assets. Trust is most visibly found in collateral because it allows non-trustworthy actors to engage in commercial transactions. The very core of the trust mechanism in any society hinges on collateral in one form or another.

The topic of collateral in the financial system has been a focal point in three categories: 1) Collateral as related with the role of margin and haircuts. 2) Collateral as a determinant for financial plumbing; rehypothecation implies collateral has a velocity. 3) Collateral as a mitigant to liquidity mismatches and a determinant for intermediation chains.

However, the lack of financial plumbing and the disparity in collateral endowments in the interconnected world have already caused lots of problems, ranging from frequent market dislocation, excessive risk-taking, and the polarization of market liquidity, and most of all, unfair burden-sharing during times of crisis. Thus, adding the digital layer on top of existing governance and collateral foundation would only aggravate the polarization, and only a few can add to the value creation. The combined nature of digital transformation dictates that the network is only a part of the necessary conditions for digital transformation, where the rest consists of talent and digital infrastructure, and free spirits. The general public has no choice but to provide the leaders with the critical ingredients for value creation in an asymmetric manner via a node in a network that transfers data and privacy. For all its emphasis on democratization and inclusive growth, the digital revolution in its present form would ultimately lead to monopoly and centralization.

This paper argues that this contradictory situation has deeper roots in a de facto monopoly regarding the collateral. Collateral is a common denominator of trust in this interconnected world. Among others, real estates and government bonds are notable examples of collateral worldwide. We need to include intangible assets, such as intellectual property, as eligible collateral. If only a limited class of collateral is accepted globally, the fragmentation of liquidity and talents is unavoidable, which will lead to even greater polarization. In practice, central banks worldwide have maintained a firm grip on collateral, which has become an

essential plumbing foundation for financial flow in an increasingly uncertain environment. This missing link divides the world into two disparate entities in an increasingly interconnected network environment. "Collateral fragmentation" basically dictates the eligible candidates for digital transformation. More specifically, collateral pledgeability determines the potential for digital transformation per se. An economy with limited cross-border pledgeability incurs significant costs associated with financial plumbing.

On the other hand, if you have eligible collateral with wide pledgeability, you can qualify as a digital transformation leader. We need a new group of collateral for digital transformation. This new breed of collateral would consist of innovative things, mostly intangible value that people have begun to realize.

Limited Collateral Use and Negative Interest Rate

The most severe challenge, for now, is the entrenched negative interest rate in advanced economies. The so-called financial repression is the result of the limited use of collateral in an increasingly integrated environment. Contrary to conventional wisdom, lowering the interest rate would not help us avoid recession. Instead, lack of discriminatory power of the term structure and various yields on benchmark rates only exacerbate the situation by obliterating the inherent functions of interest rate as risk filters. The anomaly of term-structure of interest is roughly identical to the Goodhart problem, where indicators become targets and gradually lose significant power that it is supposed to be endowed. Under this setting, the usual myopic view and short-term oriented payment scheme is the core problem our society needs to tackle. And this unfortunate choice is the result of relegating issues to future incumbents in the bureaucratic tradition. Too much reliance on an old paradigm with a minimal safe asset pool has resulted in excessive demand for flight to quality, which has brought about zero interest rates worldwide. If Asia could have nurtured its market foundation via increasing demand for public bonds as cross-border collateral, things would have been a lot different. The root problem of today's tail event situation is the adherence toward legacy collateral practices, which has resulted in a vicious cycle of debilitating the conventional monetary policy.

Reactive Governance Backwardation in a Digital Age

Things are not going in the right direction. And we need to tackle this fundamental issue related to governance. The notable example of misguided governance in a digital age is about the central bank digital currency. For instance, the so-called CBDC (Central Bank Digital Currency) is an oxymoron in the age of massive digital transformation. The core part of the financial operating system remains intact, and it is taking on different suite to respond to challenges with digital transformation. As such, re-inventing wheels in the digital revolution age continue to assume the central role of legacy institutions. The CBDC is a conditional change that hinges on the volatile financial system. What do you expect core players to change to adapt to a new environment? The core part related to governance would not change, and the allowed changes are "digital transformation for the incumbents." Why are there few successful attempts by the general public to take charge in a newly evolving environment? Given their rich resources, are they the only legitimate crusaders for digital transformation? The answer is an unequivocal no, but in reality, the answer points toward "yes." Some changes in governance are necessary to expect a renewed role for incumbent participants.

Suppose this is the direction for future change. In that case, it is not necessarily relevant to push forward the agenda for going digital because it entails greater polarization and even more significant social problems. Even with apparent benefits about cost reduction and improved efficiency, going digital hinges on the general public's enormous contributions in an intricate network setting. If the preconditions for balanced digital transformation are not satisfied, current problems of excessive polarization and disparity would only worsen, given the incumbents' firmer grip on individual activities via data advantage. Regardless of the shape and speed of their adjustment, legacy's hold on their traditional area of dominance, mostly as a network or platform operator, will remain strong. Therefore, the core messages of digital transformation, "democratization and inclusiveness," are hard to manifest among the general public. Digital transformation cannot help all participants adapting toward a new ecosystem where the multisided nature of the digital world rules. Above all, we need to have fresh, independent players to expand financial services to all for this to happen. We need an inclusive collateral foundation as collateral serves as irreplaceable financial plumbing in reality.

In a similar context, money and monetary policies have been the central banks' holy responsibilities and governments. Suppose the nature of digital transformation allows decentralized options and more opportunities for the general public. In that case, the reality of increasing centralization is a somewhat contradictory development for the monetary policy framework. Their role needs to undergo severe changes if one thinks about redefining their role in a different network environment. Every agent in this world has a different role to play, not as an extension to their conventional profile. In this respect, the idea of digital transformation needs to be rigged on a new foundation that is more open and more receptive to collaboration. Again, the future digital transformation needs to be more inclusive and accessible to all, and this requires a broadened-collateral framework beyond vehicle currency denominated assets.

Why some of the fundamental things, how services are made and delivered to the general public, would not change even with digital transformation? While the central banks worldwide are trying to wear different hats via digital transformation, the general public remains dormant, vying for extra convenience and marginal benefits at the expense of giving up their privacy and vital info. Despite such compelling needs to equip ourselves with new governance that can respond to the changing environment, the stakeholders' initial responses are short-term benefits. Changes in social governance are a gradual evolutionary process, and it takes time. If the climate has undergone structural changes, we need to expect a foundationally different role to accommodate compatible changes. It is somewhat disheartening to witness hasty entry into the digital world by early private sector entrants.

Contrary to initial expectations for more responsible and confidence-enhancing exercise in a newly evolving environment, digital transformation mostly takes root among big tech companies and legacy institutions. Now, the confidence-building activity is almost infeasible, and legacy institutions and big techs carry out nearly all the endeavors. Expecting a decentralized revolution from centralized legacy institutions is like expecting emperors to behave like civilians. To reap the benefits of digital transformation, we need engaged participation from the general public. For this, it is time to tackle issues related to collateral. An expanded set of collateral is the ultimate resource for the decentralized world with permissionless, trustless participants. The null hypothesis of misleading digital transformation has deeper roots in segmented, polarized collateral foundation globally. By resolving issues with collateral, we can put the digital transformation on balanced footings going forward.

Legacy collateral framework and innovation drive

In contrast, digital transformation based on existing narrowly defined collateral would only worsen the situation. Even with disruptive technologies, things would not change because collateral bases are heavily segmented. In contrast, digital transformation based on broadly defined collateral would help restore balance and mitigate polarization as the general public can utilize hitherto ignored collateral they are endowed. In other words, proper recognition of collateral in various forms would help restore balance in the lop-sided development for digital transformation by engaging the general public to use their resources better. Collateral per se, which performs financial plumbing in various transactions with sizable counterparty risks, is the only remaining resources for the public to utilize to begin building foundations for sustainable value creation. Collateral today is confined to restricted members, and their use is kept to a selected few. There are only a few categories for eligible collateral for financial transactions with legal support to be more specific. The limited scope is the problem, but deploying collateral is very limited among selected countries, mostly in the US and Europe.

For this reason, collateral has been relegated to remote corners of finance, and their role has been repressed. Significantly, the existing practices based on collateral in Asia are fragmented and siloed based on individual laws and regulations in each country, making it challenging to promote cross-border transactions. Therefore, broadening the base of eligible collateral is crucial to bring balance into this digital world. People need to be adequately compensated for their implicit contributions in various forms. Sometimes their existence itself can be a contributing factor in the 5G environment.

Digital Transformation with Segmented Collateral Space

In short, digital transformation with the segmented collateral pool around the world would only strengthen the positions of legacy institutions despite the decentralized options that have been made available. This contradictory phenomenon is because the existing regulatory structure only allows a very narrowly defined set of products and services that do not have a well-ground rationale, except for AML, KYC requirements. Most notably, the unbalanced status of collateral among different world regions has been the underlying factor for global

financial instability. Notably, the narrow definition of collateral limits the whole world's potential to fully adapt to a hyper-connected world and build a more inclusive economic system. Given the already polarized nature of asset holdings in various forms, the rebalancing aspects of digital transformation cannot be expected, if not going in the opposite direction. And to help energize the general public to change in good order, some form of newly discovered resources needs to be accepted. These unexploited resources are inclusive collateral, including intangible assets, and notably government bonds in emerging countries, etc. The expected n-fold interactions under the network environment cannot be expected in existing mapping conditions under a hierarchical system. Even with technical possibilities under 5G, the expanded network's legitimacy cannot be ensured due to a lack of regulatory guidelines.

Surprisingly, Asia has not even tapped into existing collateral resources for global use. The bond's inherent functions as collateral in various secured funding exercises have not taken off in the region, mainly due to lack of recognition among participants who primarily relied on official arrangements and facilities. This perspective has been founded on the observation that the general public's need for financial services hinges on a very narrowly defined collateral pool of real estate resources. Since most people have little real estate, it is infeasible to expect inclusive finance. It is essential to broaden the collateral concept so that every human being can access or utilize his/her assets in one way or the other. Other aspects of shadows cast by the legacy regime are the cumbersome cross-border transactions. Our collateral profile is defined by the lack of infrastructures to handle it, especially cross-border transactions.

The general public in the region mostly holds on to real estate collateral that cannot be accepted outside the border. The asset pledgeability determines the value of the collateral and the financial resources. Given the increasingly polarized situation of economic agents' asset holdings worldwide, it is predictable that conditions across the world are plagued with increasingly severe polarization. Excessive concentration of collateral resources in a specific jurisdiction is primarily an acute problem where sizable FX holdings support liquidity flows. In this case, FX holdings play the role of cross-border collateral backup.

The Importance of Connected Trust with Inclusive Collateral Framework

The global community confronts enormous challenges. Unlike the usual mantra, this time is different from the magnitude and severity of upcoming events that can quickly engulf ordinary life. A connected environment is good for extra convenience and incredible experiences for most people, but managing risks is a nightmare. Therefore, people tend to shy away from centralized services and have maintained very eclectic positions over many key issues, e.g., privacy and centralization of resources among the few.

The most visible contradiction is the importance of securing connected capital, which means individuals cannot even try to do something as a venture capitalist. The hard reality of startups and venture booms in Asia is that it is practically impossible to start a business without being part of the mega platform. We can find similar phenomena worldwide where core countries are even more dominating, and periphery countries are left powerless. The most compelling argument for running a business comes from securing the necessary trust foundation, hardly available in Asia. For the most part, Asia is excessively fragmented, and its bureaucratic system does not allow any meaningful decentralized efforts. The top-down legacy of legal implementation is the long tradition in which trust remains in the few privileged's hands. Even with the 5G network's advent, the core part remains unchanged, which can spell troubles of more subjugation and more market dominance by the few.

One seemingly contradictory movement in an increasingly connected world is the more robust requirements for collateral. The overall regulatory framework requires increased reliance on collateral to counteract the increasing counterparty risks. Asia sits on the prime collateral pool, yet it hardly recognizes it and cannot use it for practical purposes of raising liquidity via the market. Individually, countries in Asia have accumulated sizable FX reserves and prepared central bank swap lines after the financial crisis, securing stable market disturbances from outside. However, one of the most glaring negligence concerns the use of bonds as collateral for cross-border transactions. Lack of necessary market throughputs has resulted in big swings in exchange rate vis a via US dollars. Because of stable FX funding requirements, cross-currency swap markets have been developed extensively in the region. Derivatives and other secured funding markets are mostly about raising dollar funding with collateral or without collateral. This practice of addressing the market needs via special arrangements has worked well during normal times, but hardly enough against protection from shocks that originated in core countries. The undeniable fact is that this fragmented collateral space has

contributed to local currencies being the tools for raising local liquidity that would be exchanged with the dollar. The Yen provides a perfect example of aggravating national borders issues by making it with negative interest rate, which offers good profit opportunities for global investors. Many Asian countries share a yen premium situation with an open capital account. The policy objective of stabilizing the Yen against the dollar have wreaked havoc with the financial system such that negative interest rates remain ineffective. The current credit ratings do not tell a complete story. The fiscal expansion to secure stable market conditions would only worsen the vicious cycle toward contractionary equilibrium.

This typical financial repression story is rapidly becoming a main menu across the world. We need to engage in crucial forward-looking initiatives to make better use of collateral in the region. Given the importance of collateral in modern-day finance, it is essential to secure a basic recognition block for collateral in the region. However, the difficulty of securing the necessary ground is enormous, given the fragmented governance and system across the region. The region has never experienced the region-wide efforts to formulate a more significant market with its initiative. Therefore, it remains a tall order for the region to do something beyond national borders, especially given the lack of a common platform. In short, it is crucial to start with strategic thinking to make our future efforts meaningful.

Fixing Asia's missing link for the global financial stability: Cross-border Collateral linkage

As the evidence shows, the segmented collateral foundation is related to skewed financial flows due to a lack of proper plumbing. The origin of the problem stems from Asia's over-reliance on the external financial system with insufficient recognition of its collateral base. One of the glaring missing links lies in Asia as it manifests itself as a lack of pledgeable collateral resources. Traditionally this region has derived growth momentum from export to the US and other large economies without its financial system. Outsourcing the financial system means excessive reliance on dollar facilities and dollar funding for almost all overseas trade and financial transactions. The lack of capital market capabilities has not surfaced into a significant problem until now when the major economies have been engaging in QE and other unconventional monetary policy measures. In the presence of an impending debacle, it is hard to ignore the root cause of the problem, which underscores the importance of

recognizing and utilizing the collateral pool from Asia. Of course, this would require tremendous efforts by all member countries and blessings from the OECD's critical members. Because of this burden, this issue has been set aside as something unrealistic to solve current problems. Yet, it is becoming increasingly clear that this missing link has to be fixed before we expect normalization of capital flows globally.

Among factors to improve the cross-border asset pledgeability, we need to underscore the importance of market perception. Openness and non-discriminatory market practices are among the most critical factors that often get ignored. Given the importance of managing collateral for liquidity and stability, we must recognize factors that hold back more effective use of existing collateral. One of the neglected aspects of collateral utilization is related to internal constraints rather than externally maintained restrictions. We can often blame restrictive applications of eligibility criteria or jurisdictional proclivity toward regional considerations on the surface. Yet, the real reason for limited cross-border pledgeability is often deeply rooted in the legacy legal and regulatory framework. Among others, market information holdup problems of centralized legacy institutions, Fragmented legal practices about collateral and collateral use, and dominant positions of real estate assets in a financially underdeveloped world are often blamed for impeding the collateral use outside the national border.

It is essential to strengthen and broaden the collateral base significantly such that new trust foundations enable new interactions among an expanding pool of market participants. In reality, the legacy foundation sits on a much selected category of trust in the form of eligible collateral that typically consists of real estate, government bonds, etc. And this accepted pool of collaterals remains untouched despite the staggering expansion of value chains around the world. For instance, most developing countries' assets are not pledgeable for cross-border transactions despite their prominent credit ratings.

At its core, the collateral's role needs to be underscored since it provides the necessary trust base even in uncertain times. Without this foundational preparation, things would get centralized among big techs and legacy players. It is quite natural that talents and resources will be centralized again, precipitating a different monopoly in the digitized market environment. Thus, one of the compelling factors for global financial instability is the lack of adequate countries' responses without vehicle currency status. Their grip on the collateral pool is minimal around core assets with a few global currencies. In reality, what happens is the massive drive for digital transformation by authorities for FOMO concerns without

adequate preparation for this undertaking. From the beginning, it is challenging to expect interactions on the level-playing field because of the widely different initial conditions of periphery countries.

In essence, a digital transformation is all about connecting dots in ways never tried before because a new digital-driven trust foundation can expand beyond legal and regulatory perimeters. However, this is just one element for balanced digital transformation: we also need more significant participation of the general public as active members and expanded financial services to support their efforts. The latter two elements are still not taking shape. In reality, incumbents are making the first move without the collaborative progress of the other two. Likewise, making connections between vehicle currency countries with all the right market infrastructures with little or no infrastructure is challenging for the global financial system that requires a broadened collateral foundation. This paper sketches the importance of expanding the collateral base to allow finance changes to activate the other two factors for balanced digital transformation. When the underlying three factors for digital transformation are lacking, the digital transformation will lead to severe problems, e.g., greater polarization and serious interventions by authorities going forward.

Emerging economies are trying to make some progress in digital transformation in areas like fintech, etc., without approaching deeper issues in a foundational manner to avoid unnecessary disputes. For instance, given EM's reliance on safe assets to avoid dislocation with the global financial system, continued instability has exerted significant pressures on emerging economies. Despite their best efforts to maintain stability against an increasingly integrated economic environment, we see substantial distortions in global capital flows. Even with these structural problems, the world is also under pressure to prepare itself for digital transformation, which may well be a source of additional burden, if not foretelling significant benefits for all going forward.

One of the most puzzling phenomena in an increasingly interconnected world is the legacy financial system's coercive dominance with a rehashed version of their well-kept grip on the core of financial services. Even wrong decisions with long-term implications by the legacy regime cannot be stopped. While the digital revolution's right message involves the core notion that legacy entities are hindrances to better options for the general public, what appears is the repeated mantra that nothing can be done without their intervention. Increasing demand for collateral assets in the aftermath of the financial crisis has raised concerns about a shortage of high-quality assets (HQA). Drawing on a recent report by the Committee on the

Global Financial System, we argue that such situations seem unjustified. In aggregate, the increase in the supply of HQA appears sufficient to meet the additional demand arising from both market forces and regulatory changes. But given the uneven distribution of HQA among countries and sheer lack of infrastructures to mobilize them, higher demand from emerging economies is likely to trigger market responses that could themselves generate risks for the financial system and thus warrant further monitoring.

References

Adrian, T., Shin, H. (2019). Liquidity and Leverage. *Journal of Financial Intermediation 19*(3). 418-437. http://www.sciencedirect.com/science/article/pii/S1042-9573(08)00076-4

Brunnermeier, M., Pedersen, L. (2009). Market Liquidity and Funding Liquidity. *The Review of Financial Studies 22*(6). 2201-2238. Oxford University Press. http://www.jstor.org/stable/30225714

Brunnermeir, M., Gorton, G., & Krishnamurthy, A. (2012). Risk Topography. *NBER Macroeconomics Annual 26*(1). 149-176). http://dx.doi.org/10.1086/663991

Geanakoplos, J. (2003). Liquidity, Default and Crashes: Endogenous Contracts in General Equilibrium. *Advances in Economics and Econometrics: Theory and Applications, Eighth World Conference, Volume II*. 170-205. Cambridge University Press. https://cpb-us-w2.wpmucdn.com/campuspress.yale.edu/dist/4/1744/files/2017/07/44.-Liquidity-Default-and-Crashes-Endogenous-Contracts-in-General-Equilibrium-2003-25k0kh6.pdf

Gorton, B., Metrick, A. (2009). Securitized Banking and the Run on Repo. NBER Working Paper No.15223. https://www.nber.org/papers/w15223

Krishnamurthy, A., Nagel, S., Orlov, Dmitry. (2011). Haircuts and Repo Rates: Evidence from Money Market Mutual Fund Filings [PDF]. National Centre of Competence in Research. https://www.nccr-finrisk.uzh.ch/media/pdf/presentation%20-%20Nagel.pdf

Shleifer, A., Robert, V. (2011). Fire Sales in Finance and Macroeconomics. *Journal of Economic Perspectives 25*(1). 29-48. https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.25.1.29

Singh, M. (2010). Collateral, Netting, and Systemic Risk in OTC Derivatives Market. IMF Working Paper No. 10/99. https://www.imf.org/external/pubs/ft/wp/2010/wp1099.pdf