Technocultural Pluralism: A "Clash of Civilizations" in Technology?

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ABSTRACT

At the end of the Cold War, the renowned political scientist, Samuel Huntington, argued that future conflicts were more likely to stem from cultural frictions – ideologies, social norms, and political systems – rather than political or economic frictions. Huntington focused his concern on the future of geopolitics in a rapidly shrinking world. This paper argues that a similar dynamic is at play in the interaction of technology cultures. We emphasize the role of culture in the evolution of technology and identify the particular role that culture (esp. privacy culture) plays in the development of AI/ML technologies. Then we examine some implications that this perspective brings to the fore.

CCS CONCEPTS

• **Social and professional topics → Governmental regulations**; **Privacy policies**; *Transborder data flow*.

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1 INTRODUCTION

At the end of the Cold War, Samuel Huntington, argued that future conflicts were more likely to stem from cultural frictions -– ideologies, social norms, and political systems – rather than political or economic frictions [9, 10]. Huntington was focused on the future of geopolitics in a rapidly shrinking world. But his argument applies as forcefully (if not more) to the interaction of what we might call *technocultures*.

This discussion will use the term technoculture to refer to the global patchwork of interacting technology ecosystems in which we now live. These do not have to be geographically or geopolitically constrained. But they often do rehash geopolitical boundaries due to the influence that local governance exerts on technology development and adoption. As a simple intuitive illustration of such distinct ecosystems, observe the variation in popular choice of social media tech platforms across the globe circa 2016 (Figure 1.). Given the global reach of such tech platforms (e.g. Facebook, WhatsApp, TikTok, etc.), these variations can give noisy hints about where technocultural fault-lines lie. Differentiation into these ecosystems is likely characterized not just by concordance in tech adoption, but also by consensus in culture, values, policies, tech innovation, and deployment priorities.

We develop and explore two key hypotheses in relation to technocultures:

- **[Technocultural Frictions]**: an AI "technocultural cold war" is already in progress. This refers to a state of ongoing regulatory friction among multiple interacting technocultures or governance regimes. The effect of factors like effective geographic proximity, political necessity, and/or economic advantage conspire to make technocultural isolation rare. And the inevitable interactions result in frictions. The focus here is on competitive or adversarial frictions[1]. Put differently, technocultural friction refers to regulatory frictions due to the necessary interaction among technology policy spheres of influence [2].
- **[Technocultural Pluralism]**: the prospect of a global monolithic AI technoculture emerging in the near-future is implausible[3]. Persistent pluralism is more likely. Pluralism here refers to persistent diversity in the global technoculture. The primary support for this hypothesis is admittedly an extrapolation. The extrapolation is based on two premises: 1.) technology is strongly influenced by local culture; & 2.) there continues to be strong global variation in cultures and values. Then a basic extrapolation suggests that technology regimes will continue to reflect the diversity of cultures.

These hypotheses are not necessarily AI-specific. But the current efflorescence of innovation in data-hungry machine learning technology provides a good sand-box for making our discussions more concrete.

This paper has two aims. The first aim is descriptive (like most of Huntington's original 1993 discussion). The aim is to describe underlying factors and dynamics that foster the development of differentiated technocultures. We identify and clarify some key concepts in the process. For example, we paint a clearer picture of the concept of a technoculture. This descriptive exploration is intended

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[1] Not focusing on military frictions in this discussion in spite of the use of the "cold war" metaphor.
[2] Whereas Huntington wrote about "civilizations," we can think of the relevant units of analysis here as policy spheres of influence. These may be national (e.g. China, USA), subnational (e.g. California, Texas), or even supranational (e.g. the EU) aggregate entities that exert some form of regulatory control over their geographical jurisdictions.
[3] This is not asserting impossibility in the long-run. That would require strong claims about cultural evolution that cannot be supported by the simple inductive extrapolation suggested here.

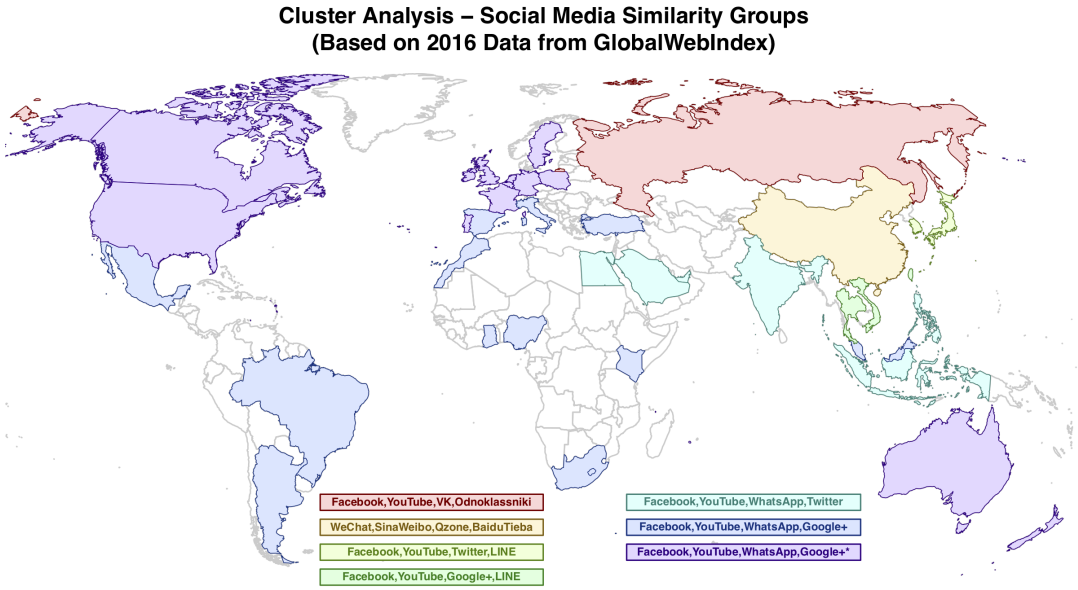

Figure 1: Geographical variation in the relative popularity of social media platforms based on 2016 3rd party data. Populations in different jurisdictions tend to co-adopt signature collections of social media platforms. Examples of such collections include (WeChat, SinaWeibo, Qzone, BaiduTieba) and (Facebook, YouTube, WhatsApp, Google+). There can also be variation in rates or patterns of adoption within the same platform collection. For example, the figure shows that North and South America share the same vector of co-adopted platforms. But the two demographics are separable based on the relative rates of adoption for the individual platforms within the same collection. Interestingly, the observed platform co-adoption clusterings align quite closely to the cultural fault-lines Huntington outlined almost 30 years ago. We can roughly make out Western-Europe-and-USA-and-Australia, China, Eastern Europe, Japan, and Islamic-Hindu spheres of influence. (Data Courtesy of GlobalWebIndex.net).

to also serve a persuasive function. Technocultures are easier to track once we observe how the warp and weft of technology innovation, deployment, culture-specific norms, and regulation "conspire" to differentiate our global technology environment. The second aim is to extend beyond pure description by highlighting notable dynamics and implications of technocultural pluralism. It is worth highlighting specifically the important implications of data privacy policies, data localization, and population size as mechanisms for differentiation and evolution in current instances of technocultures.

Part of the motivation for this discussion is to counter a specific perspective. This perspective anticipates a future regulatory scenario featuring a monolithic global technology ecosystem with little to no geographic cultural variation. Although this is admittedly a strawman position, elements of this position arise in technology policy conversations. The narrative of an impending technology monoculture may be seductive because it promises a future with a simpler tech regulatory environment. But the simplicity of that hypothetical future is not necessarily an argument for the likelihood of its occurrence. Or its desirability... What can we say about the prospects of such a monolithic technocultural world? If the simpler monocultural outcome is less likely, what are the regulatory and governance implications? Hopefully this exploration starts us off with basic tools to gain more insight into these types of questions.

2 TECHNOCULTURE: A DEFINITION

First there is a question of what we mean by a technoculture.

The term technoculture here refers specifically to the combination of a technology ecosystem and the *culture*[4] in which it is embedded. The concept of a technoculture forces an engagement with questions of how cultural contexts affect, influence, or determine the evolution, deployment, and adoption of technology artifacts. This will include questions about the controlling innovation culture, the prioritization of problems for technological innovation, expected modes of deployment, etc.

[4] The word culture tends to raise intellectual hackles because of its supposedly nebulous or imprecise definition. However definitional imprecision is not sufficient reason for asserting non-existence. We use culture here to refer to persistent societal norms and values that circumscribe observed behavior. The social psychologist, Geert Hofstede, defines culture as "the collective programming of the mind that distinguishes [groups]." Less abstractly, a recent exploration on methodologies for research on culture [14] defines cultures as "...the set of social influences that alter an individual's behaviors and beliefs..." There is significant body of work in anthropology that attempts to define and explore constructively valid models of culture including Hofstede's work on dimensions of culture [8] and Romney et al.'s work on identifying cultural groups via "high concordance" on social knowledge [19]

Is this (or any) conception of technoculture useful?

At first glance, the concept of technoculture may seem paradoxical; technology is often construed to be this objective or value-neutral fruit of dispassionate scientific analysis and design. But even under the debatable assumption of a perfectly value-neutral design process, the choice of problems on which to apply technological innovation is subject to cultural influence. As a recent anecdotal illustration, take the polarized response to the demonstration of the use of machine learning models to infer criminality from face images [23].

Another example fraught with deterrence implications involves differences between the USA [5, 20] and China [1] on stated doctrines of use for AI/ML and artificial autonomy in warfare. The USA's initial position (as stated in its 2012 DoD Directive 3000.09) emphasized a requirement that weapon systems the feature artificial autonomy allow 'appropriate levels of human judgment over the use of force.' The Chinese position (as stated in its 2017 AI Development Plan) is less cautious about retaining human control, promoting the use and embedding of 'all kinds of AI technology' in national defense.

Even the assumption of value-neutral scientific design wilts under light scrutiny. The constraints of ML development processes mean that designers make myriad non-negotiable design choices that will affect users[5], including users with unexpected characteristics. Some of these design choices include impositions of norms and values (e.g. concerning fairness/equity, transparency). The Nymwars of 2012 gives a concrete case in point [2]: social media platform designers decided to impose and enforce the norm of only allowing profiles with real names. That decision stood in opposition to established norms of online pseudonymy in certain sub-cultures.

There is growing acceptance of the assertion that technology is inherently cultural given these observations [7]. Technological artifacts are not free of cultural or ethical values (implicit or explicit). Cultural values infuse the innovation, design, and use of technology. Winner [22] recounts numerous examples of conscious and unconscious deployment of technology artifacts that either imposed or fostered political preferences (e.g. decisions in town-planning in Long Island, NY explicitly designed to enforce extralegal segregationist preferences).

2.1 The Influence of Culture on Data-driven Technologies

The influence of culture on modern AI/ML technology is especially salient. Modern AI depends primarily on data for its efficacy. Data ecosystems are comprehensive records of cultural values and norms — neutral, good, or bad. Current conversations about data-diet vulnerabilities in AI and biases in algorithms highlights this point more emphatically [3, 4, 17, 18]. Modern data-driven ML systems learn patterns (e.g. language behaviors and biases) present in their training data.

Furthermore, the contours of existing and future data ecosystems are strongly determined by operating *data privacy regulations*. Questions of privacy are (at least) as cultural as they are technological. On the cultural dimension, cross-national survey studies of attitudes towards privacy and cultural influences on privacy show significant relationships between privacy behaviors and quantified cultural factors[6] especially pragmatism, individualism, and country[11, 12]. These relationships are found to hold even after controlling for population experience with/exposure to technology.

Besides the cultural dimensions of data generation, privacy enhancing technologies and privacy policies[7] also determine how much and what kinds of data are available to train AI systems. Privacy enhancing technologies (PETs) highlight the outer physical limits of privacy preservation. Privacy policies occupy a space between cultural factors and technology. These policies allocate rights and specify incentives to govern the behavior of data sources and sinks. Cultural and consensual norms influence the overall balance of such of rights and incentives. The EU's GDPR sets a precedent asserting the rights of users as primary individual controllers of their data (control but not necessarily rights to compensation for use). Chinese governance culture includes a precedent of asserting communal control of individual data to address public welfare (e.g. to control public information consumption or to enable public reputation scoring).

2.2 Why Do Technocultures Matter? Is a Universal Technoculture Plausible?

Back to Samuel Huntington's post-cold-war observations and its adaptation to technocultures. If the discussion in the previous section is compelling enough, then we are led to concede the following:

(1) AI technology (and any technology) is subject to the influence of its cultural context.
(2) There is a global diversity of technocultural contexts – even if the geopolitical boundaries or fault-lines are fuzzily defined at best.
(3) Cultural values inform tech evolution, tech policy, and tech regulation – especially when data and AI/ML are involved.

Interaction between technocultures is unavoidable in our rapidly shrinking world. And differences in policy and regulation can lead to friction in interaction. This leads to the aforementioned twofold hypothesis about technocultural frictions and pluralism. The interplay of the highlighted technocultural factors hint at the idea that the global AI technology ecosystem is likely to fracture along the culture-specific lines telegraphed in these data ecosystems. And AI's intense data dependence means privacy policy is likely a key lever in technocultural divergence.

The technocultural friction point is evident given:

- recent discussions of "AI arms races;"
- the flurry of AI strategy statements from different countries;

[5] Latanya Sweeney calls this state of affairs a "technocracy." She argues that this is effectively a regime of rule-making, governance, or policy-making implemented by unelected technology designers. This is somewhat reminiscent of Lessig's "code is law" thesis.

[6] There is a significant body of psychometrics literature on the relevant quantitative dimensions for a constructively valid signature of culture. Most of the cited studies on privacy attitudes rely on Hofstede's dimensions [8]: *Individualism, Masculinity, Power Distance, and Uncertainty Avoidance.* A key critique of this quantitative framework is the issue of the level of geographic aggregation [15]. This critique is highly relevant for a key question: how does one identify a geopolitically contiguous, culturally cohesive unit?

[7] The underlying and potentially contentious premise here is that policy is an imperfect crystallization of cultural values as expressed through laws, regulations, and social norms.

- recent geopolitical squabbles over commercial data localization[8] and/or foreign investment in sensitive tech sectors; &
- tech multinational firms incurring punishments in foreign jurisdictions for behaviors that are accepted in their home jurisdictions.

The hypothesis of persistent technocultural pluralism is harder to support fully since it is a statement about the future evolution of technocultures. In the context of data-driven AI tech, the cultural-specificity of available or accessible training data (either due to local norms in data behavior or due to local data privacy policies), may lead to persistent fracturing the evolution of AI tech. In the more general technology context, observable cultural differences in tech use, innovation, and regulation suggests persistent differentiation.

The pluralism hypothesis is admittedly a less-than-ironclad prediction. Persistent pluralism is a conservative prediction; but it is likely a reasonable one given the historical record on cultural evolution. The basic observation is there has so far not been a global cultural convergence in the long (short?) history of civilization. Cultural differences (e.g. in language use) persist in spite of long interaction. The likelihood of technocultural monolithic future is on par with the likelihood of culturally monolithic future.

3 PLURALISM. SO WHAT?

What are the strategic implications of these hypotheses? A persistently pluralist technocultural future raises some hard questions like: Are technocultural differences truly unresolvable in the long-term? What are the possible equilibria in the long-run? Can a multi-polar technocultural world be stable? Are technocultures inherently "winner take all"? Is there an alternative to technocultural dominance? In the short run, how do we understand the space of potential technocultural frictions and conflicts? What are the *evolutionarily stable strategies* in the interaction of technocultures?

Definite answers to these questions are hard[9]. So instead we can explore a characterization of features of an inhomogeneous tech ecosystem and an examination of plausible future scenarios that arise under the pluralism hypothesis.

It is worth highlighting that pluralism is not necessarily a negative. The ability of local domains to determine local technoculture can be very empowering, effective, or efficient e.g. the ability of poorer nations to adopt technologies and deploy them to solve pressing local problems.

3.1 A Pluralist World: Useful Levers & Interesting Dynamics

It is useful to explore how the actions of aggregate agents (government, populations, commercial entities) can influence the evolution of AI technology and the global technoculture more generally. Here is a non-exhaustive exploration in broad-strokes:

3.1.1 Data Localization Policies. Data localization is an emerging trend in data privacy and technology regulation. Data localization refers to restrictions or prohibitions on exporting data about local citizens or data originating from local sources. Notable examples of such regulations include EU's GDPR Article 45 , China's Cybersecurity Law Article 37 and Russia's Federal Law no.242-FZ [6][10]. GDPR's Article 45.2(a), for example, requires an assessment of the normative "adequacy" of foreign jurisdictions before certifying the outward transfer of EU data. Article 37 of China's Cybersecurity Law articulates similar constraints on outward data flows. Exceptions would require extensive security vetting.

There are defensible reasons for imposing localization regulations:

(1) **[Security Constraints]** Data localization can help prevent foreign intelligence breaches. Information traffic about domestic affairs flowing in foreign jurisdictions is often easier to intercept both physically and legally. Forcing local processing and storage (sometimes even transmission) reduces the risk of interception[21]. Furthermore, data localization makes information relevant to domestic security and safety more readily accessible within the jurisdiction. Technocultures as different in values as the EU and China both agree on the occasional need to breach privacy in pursuit of security or safety.
(2) **[Contextual Integrity]** Data localization helps preserve the contextual integrity [16] and any other related normative or cultural constraints of citizens' data. Privacy norms are value-/culture-dependent. One conception of privacy is of privacy as a form of contextual integrity. Under this conception, privacy preservation is tied to the (explicit or implicit) norms of the specific jurisdiction of the data subjects and the expectations associated with the data application. Non-local data handling increases the exposure of subjects' data to inappropriate contexts with privacy norms that are insufficiently aligned with local norms. There is thus a higher risk of violating contextual integrity and/or locally-acceptable privacy norms.
(3) **[Self-Interest]** Data localization helps foster the local technology ecosystem. And it provides a legal mechanism for enforcing contextual integrity as discussed above. Data localization is especially central for the pluralism hypothesis as related to AI. Localization will often foster the development of local technical competence with data technologies. This competence is foundational for enabling innovations in AI and developing AI solutions tailored to local problems.

The combination of factors such as these drives the trend towards a more fractured global environment. Increased data localization fosters siloed technocultures.

3.1.2 Attractive *Populations: Strength in Numbers.* Regulatory levers like data localization have the effect of placing a cognitive burden on interested multinational firms. They need some familiarity

[8] Data localization comes up mainly in privacy policies, specifically EU's GDPR and China Cybersecurity Law. Data localization refers to regulations that impose barriers on the free flow of data across geopolitical borders.

[9] Huntington's discussion argues against the feasibility of any form of global domination. His main policy response was developing a more culturally-informed understanding of local politics and learning "accommodation."

[10] Russia's 2014 Federal Law no. 242-FZ amends Russian Federal Law no. 152 ("On Personal Data") by introducing Article 18(5) which requires the use of local databases to process and store data on Russian citizens. The list of other countries with similar or related localization laws includes: Nigeria, South Korea, Vietnam, Indonesia, and Malaysia.

with local norms if they intend to operate profitably and legally within foreign jurisdictions. Ideally there is a benefit for shouldering that burden. That benefit comes from the economic power of a population-base. We can use the term "attractiveness" to refer to the influence that populations can exert on technocultures just by being sizeable sources of profit. The magnitude of a target populations's influence is somewhat proportional to its size.

Large populations attract economic attention as markets for economic goods. Jurisdictions with large population bases present a large pool of potential consumers. Firms that are able to survive regulatory and operational challenges qualify to play for larger potential (or actual) profits. In this scenario, regulatory barriers may operate as mechanisms for depriving competitors who are unwilling/unable to satisfy local norms of market share. Regulation and policy-making can thus be construed as acts of collective bargaining on behalf of a jurisdiction's population. This dynamic is reminiscent of Lindblom's thesis on how markets can often capture policy deliberations in hidden yet powerful ways [13].

The past demises of Apple, Google, Uber, and Facebook operations in China are useful illustrations. Recent Apple and Google overtures to resume some operations in China also illustrate the strength of the attractiveness of that user-base.

As a lever in technocultural evolution, population size has a couple of modes of use. Countries with large populations can use their influence to extract concessions or compromises. This can be an explicit interaction e.g. China sanctioning firms that do not provide state access to collected user data[11]. The opportunity cost for a multinational firm closing down operations because of some regulatory barrier is higher for larger countries than for smaller. Influence can also be exerted via implicit negotiation, e.g. the EU using the weight of its population-base to shift international data privacy discourse and practice via ambitious regulation.

Populations also attract attention as sources of technical expertise or human capital at advantageous price points. This is useful to highlight because human capital comes equipped with value systems that can sharply affect the evolution of tech innovation and deployment. The moral aversion to defense-related uses of AI recently expressed by significant portions of Silicon Valley technical work-force offers a case in point.

3.1.3 Winners and First-Movers. There has historically been a form of first-mover's advantage in technology innovation. Intellectual property (IP) rights actually aim to strengthen this advantage as a way of incentivizing innovation. In recent history, for instance, the USA enjoyed unparalleled technocultural dominance. Current Internet technology still bears some reminders of its US-centric early development (e.g. USA's network centrality in internet routing and other vestiges of US-led tech standards formation). The migration of talent to the USA during WW2 helped cultivate this advantage. As did the relative depression of Chinese and Russian innovation due to experiments with versions of Communism.

[11] As required by Article 28 of the Cybersecurity Law: "Network operators shall provide technical support and assistance to public security organs' and state security organs; lawful activities preserving national security and investigating crimes." Cybersecurity Law, 2016.

There is also a strong bias towards survivors of technology arms-races: a winner-take-all dynamic or close to it. As a first approximation, effective tech innovations spread and drive less effective innovations to extinction (practical performance as the fitness metric). But the memetic resonance of modern information technology platforms may not be as fully determined by practical performance e.g. the geographic differences in adoption of international platforms like facebook and vKontakte is likely not just a function of differences in technical performance. But the dynamics of network effects and preferential attachment to popular platforms leads to cumulative survival advantages that approximate winner-take-all behavior.

These trends, first-mover's advantage and winner-take-all, may mediate local economic advantages as well as a technoculture's influence on future policy. But these trends are not "unchallenged laws of nature." MySpace gave way to Facebook in spite of precedence. As did Yahoo to Google in search technology. And the fracturing of the modern social media ecosystem suggests that network effects are not irreversible.

3.2 Paths of Evolution: Local Norms with Global Reach

There is a deliberate analogy between ecology of technocultures and the ecology of biological ecosystem. Species in an ecosystem interact (cooperatively or competitively) and evolve in response to their environmental context. Similarly, technologies, platforms, firms, governments interact and co-evolve in response their specific cultural context.

The analogy suggests a mechanism of technocultural adaptation and evolution: technology cross-over. Geographical distance may have served as a barrier against the transmission of technocultural cultural influence in the past. But distance is no longer a strong barrier. Technocultures now evolve in a crowded international space. One technoculture might foster a specific innovation in tech use, development, or regulation. Such innovative mutations may now be more easily transmitted across technocultures. And such mutations may find stronger resonance in non-native contexts. Such cross-technocultural transmissions may be beneficial or virulent. For example, the spread of GDPR concepts from the EU into California privacy regulation (CCPA) is beneficial (depending on ones normative frame).

We can also play with the prospect of convergent evolution in technology e.g. the convergent evolution of printing technology in the East and the West, or the convergent evolution of flight and photography. Intense global interaction may mean it becomes easier to adopt foreign innovations rather than innovate locally (thus reducing the likelihood or opportunities for convergent evolution). The key theme here is of local norms and actions having unprecedented global reach.

Innovations in AI tech also change the balance of influence in international relations. Nation-states naturally develop the abilities necessary to pursue their interest in cyberspace. It is reasonable to expect this trend to continue. But the context is slightly shifted somewhat... Now smaller anti-social non-state actors with some AI expertise have an expanded ability to project influence and hold

larger actors hostage. Especially if there are no trusted referees to mediate disputes.

4 CONCLUSION: THE FRUITS OF A PLURALIST FRAMING

The purpose of this piece was to encourage the serious consideration of the prospect of unresolvable cultural schisms in the global technology landscape. Culturally-mediated fault-lines are particularly salient when dealing with data-driven AI technologies which make-up the bulk of modern AI technology. This is because culture-dependent privacy norms circumscribe what data is available, accessible, or permissible for training AI systems. The general interaction of culture and technology is what we have termed a technoculture. The point of introducing this concept is to provide a fruitful lens for examining the evolution of technology.

We have referred to the fractured state of the global technology ecosystem as Technocultural Pluralism. In a sense, this pluralist conception has been the historic norm. Our multicultural history is not a history of globally uniform patterns in tech innovation and deployment. The key assertion in this piece is that pluralism is likely a more permanent state than one might perhaps think – globalization, disruptive AI innovation, and (potentially/supposedly?) impending singularity notwithstanding. Language use serves as an informative precedent. Language is one of humanity's oldest culture-infused tech innovations. Yet it still retains a level of cultural specificity that is unlikely to fade away soon. Why expect anything else for AI on a shorter time-scale?

Taking pluralism seriously does not mean assuming a permanent Hobbesian state of "War of All Against All." There is certainly bound to be friction as technocultures negotiate their shared existence on a smaller global stage, under diverse, sometimes diametrically opposed value systems (technocultural clashes, to use Huntington's term). It also does not mean a constant arms-race or drive towards domination. The arms-race perspective is well-suited to discussions of defense in which the controlling objective was about survival and actions are centrally directed. In any given modern technoculture, there will be multiple preferences, utilities, or objectives in play. And the aggregate behavior of the technoculture is an impenetrable function of millions or billions of sub-agents' choices.

Taking pluralism seriously means spending more time exploring the features and dynamics of our global technocultural ecosystem. This piece represents one such exploration.

What strategic implications does a technoculturally pluralist framing highlight? One key implication would be the pivotal role of data localization and privacy policies in influencing the evolution of technocultures in the age of AI. This is because data localization undermines uniformity in what data exists or is accessible in different jurisdictions for training local AI/ML solutions. A more positive take on this implication is that data localization and local privacy policies can help foster more culturally-relevant AI/ML tech innovation.

Questions remain. For example: What are the merits of a technocultural equivalent of the "Contact Hypothesis"? i.e. does more contact between technocultures lead to better long-term accommodation? Or to heated frictions and virulent cross-infections? What are effective strategies and compromises in a technoculturally pluralist world?

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