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The political economy of digital authoritarianism: evidence from the Iranian regime's implementation of technology

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ABSTRACT

A strong but complex interplay is emerging between the politico-economic and digital aspects of authoritarianism, raising questions as to how this relates to the existing political economy of authoritarianism that has been observed over the course of many decades. This article asks: Are the politico-economic dynamics that have long shaped authoritarianism also relevant to understanding digital authoritarianism? To answer the question, this article identifies three mechanisms through which the longstanding politico-economic dynamics of authoritarianism also shape the implementation of digital authoritarianism. These mechanisms are then exemplified and illustrated with evidence from Iran. It contributes to the emerging literature on the political economy of digital authoritarianism, making two key findings. First, digital authoritarianism is subject to the same politico-economic constraints that shaped the pre-digital operating environment the authoritarian state. Second, this complex and longstanding politico-economic context plays a key role in shaping and bounding a regime's survival-driven technology agenda.

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KEYWORDS Authoritarianism; digital authoritarianism; authoritarian upgrading; authoritarian innovation; authoritarian economics

Introduction

In 2011, the Chinese private technology giant TenCent released the WeChat smartphone messaging app. Its userbase skyrocketed in the years that followed as the app added social media functionality and an e-commerce service that supported banking and online shopping. By the time of writing in 2025, WeChat was deeply embedded in everyday life in China, being used for everything from instant messaging, payments, group chats, bike rental, travel bookings and food ordering, to making purchases in physical shops.[1] But in an authoritarian context, WeChat plays a role well beyond

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consumer convenience: The Chinese government enacts heavy surveillance on the app, regularly making arrests on the basis of private conversations or public posts, and removing content and blocking users for posting sensitive material. This has raised questions about whether users self-censor to avoid becoming an economic and "digital non-person" who is barred from accessing software that has become central to modern living in China.[2] These politico-economic draw cards in turn make WeChat a valuable tool in the Chinese government's pursuit of population control.

Indeed, while China is leveraging the interplay between technology, economic lives and authoritarianism,[3] it is by no means alone in this pursuit. It is a dynamic that is becoming intrinsic to digital authoritarianism, a term that refers to an authoritarian regime's survival-driven technology agenda that guides its selection of technological tools and determines how they are deployed. Economic tools are emerging as a key element of autocrats' efforts to support the rollout of technology and shape populations' technology use. For example, Russia passed legislation in 2021 that provided free access to certain websites in an effort to financially shape the online behaviour of its citizens.[4] Venezuela is now offering higher pensions to senior citizens who download the country's Sistema Patria app that gives the government access to the internal workings of their smartphones.[5] In turn however, digital overreach can create economic problems: in Zimbabwe, internet restrictions significantly eroded the balance sheets of Internet Service Providers (ISPs), undermining the loyalty of a pro-regime constituency.[6] Indeed, a strong but complex interplay is emerging between the politico-economic and digital aspects of authoritarianism, raising questions as to how this relates to the existing political economy of authoritarianism that has been observed over the course of many decades. This prompts this article to ask: Are the economic dynamics that have long shaped authoritarianism also relevant to understanding the political economy of digital authoritarianism? By "political economy," it refers to the interconnection between the social, political and economic stakeholders and processes that shape a state's political and economic health and operating environment.

To answer the question, this article identifies three mechanisms through which the longstanding politico-economic dynamics of authoritarianism also shape the implementation of digital authoritarianism. These mechanisms are then exemplified and illustrated with evidence from Iran. This approach was selected because while the political economy of a state is historically contingent and context-specific, some generalizable theoretical patterns exist across authoritarian regimes. Iran was chosen because its regime has one of the most ambitious survival-driven technology agendas in the world. It is what Seawright would categorize as an "extreme case" of digital authoritarianism because it has the dubious honour of being ranked among both the least-free and most technologically advanced states on the planet.[7] The Iranian regime is already extensively relying on economic measures to support technology implementation. It therefore represents a key opportunity to analyse how a state's politico-economic context interacts, co-exists with – or disrupts – the regime's digital authoritarian agenda.

The article proceeds in three parts. The first section situates digital authoritarianism within the authoritarianism literature, before undertaking a literature review on the economic aspects of authoritarianism and digital authoritarianism. It then uses this review to identify the three mechanisms through which a state's political economy influences the rollout of digital authoritarianism. Section two explains case selection and methods, before providing a brief history of the Iranian regime's digital

authoritarian agenda. The third section illustrates the mechanisms through examination of the extensive and complex interplay that has emerged between the Iranian regime's economic strategies and digital authoritarianism.

The article finds significant interaction between long-standing patterns of authoritarian economic strategy and digital authoritarianism. This means that while a state's economy can provide autocrats with a gamut of tools to support the implementation of digital authoritarianism, it also conveys significant risks that act as a brake on some of the most extreme manifestations of the phenomenon. This means that autocrats do not have an infinite capacity to implement their digital agendas, an important empirical finding in the context of the latest *Freedom on the Net* report that found that global internet freedom has declined for a 14th year in a row.[8]

The article makes two key contributions. First, it contributes to the literature on digital authoritarianism by highlighting the continuities between it and the authoritarian political strategies that preceded it. This finding sits alongside other pieces in this special issue on "authoritarianism reloaded" by highlighting that digital authoritarianism is deeply embedded in the politico-economic context of the state in which it is being implemented, ensuring that long-standing authoritarian economic practices remain relevant and powerful in the digital era. Second, the article contributes to the emerging literature on the political economy of digital authoritarianism by drawing attention to the profound role that politico-economic dynamics play in facilitating and limiting digital authoritarianism. The article's conceptual mechanisms and empirical contribution will support future scholars to undertake comparative work to understand the prospects of digital authoritarianism being fully implemented across other states.

The political economy of authoritarianism and digital authoritarianism: a literature review

The Internet was initially viewed as a "liberation technology"[9] that would hasten the global spread of freedom. It was welcomed by world leaders such as Ronald Reagan who enthusiastically declared that "the Goliath of totalitarianism will be brought down by the David of the microchip."[10] However, as technology developed, it became clear that instead of eroding regimes, technology was being appropriated by autocrats for their own political gain,[11] leading Erixon and Lee-Makiyama to coin the term "digital authoritarianism" in 2011.[12] The term has since entered the mainstream lexicon as the descriptor adopted by academics, think tank scholars and politicians,[13] although its exact nature remains an open debate. Scholars currently question whether "digital authoritarianism" describes the use of technology by authoritarian regimes, or is a broader "practice" that can be conducted in any political context by an individual with authoritarian or "accountability-sabotaging" tendencies.[14] Although it is beyond the scope of this article to contribute to this rapidly evolving discussion, the article adopts the former approach that focusses only on authoritarian regimes given its interest in understanding how technology implementation is interacting with the existing political economy of a state.

Given that digital authoritarianism is primarily driven by autocratic survival-seeking, it sits squarely within the context of autocrats' long-established need to constantly fortify themselves. Survival has always been the chief concern of authoritarian regimes,[15] which drives the implementation of a range of tactics and tools, and leads to the continuous pursuit of new strategies to enhance population control. This

survival-driven innovation is a hallmark of contemporary authoritarian regimes,[16] with technology having provided an almost-bottomless toolbox for innovation and experimentation over the past three decades. But no authoritarian regime's efforts to do this sit in a vacuum: the use of any tool must be carefully considered, with the costs, benefits and chances of success weighed against the politico-economic confines of the regime. The success of any digital authoritarian agenda is inevitably shaped by this context.

The political economy of digital authoritarianism is an area of emerging scholarly interest. Scholars have noted the prominent role of the private sector in technology development in authoritarian regimes, conceptualizing the mutually-beneficial politico-economic nexus that has emerged between regimes and domestic and global technology companies,[17] and even not-for-profits.[18] As Daminov explained, "co-opted businesses in autocracies provide the technological know-how and maintain the necessary infrastructure required for coercion in exchange for tangible or non-tangible benefits."[19] This has led to a "commercial-state surveillance complex"[20] or "state-subsidised surveillance-industrial complex,"[21] with scholars conceptualizing the complex and unequal power dynamics that guide such public-private partnerships,[22] and observing how such relationship dynamics shape authoritarianism beyond borders.[23] Others have examined the politico-economic benefits that technology delivers authoritarian regimes: new banking and finance technology supports economic progress while enhancing regime political control,[24] while public-private collaboration has led to the development of economic and lifestyle technology that delivers the regime a popularity dividend.[25]

Of most relevance to this article is the fledgling work on the economics of specific aspects of digital authoritarianism. Scholars found that surveillance and censorship requirements in Russia significantly increased ISPs' costs and represented "an additional obstacle for successful development of their businesses."[26] Similar patterns were observed in Zimbabwe following internet shutdowns, although ISPs were unable to protest "for fear of political harassment and victimization and threats of arbitrary imprisonment."[27] Broader economic conditions have also been found to shape variations in internet filtering between jurisdictions.[28] Yet while these important works have established a link between economic factors and individual technologies, it is less clear whether a state's longstanding politico-economic context helps or hinders the implementation of digital authoritarian agendas as a whole.

Given that digital authoritarianism has become a central tool in long-established patterns of survival-seeking in authoritarian regimes, there is much reason to believe that the existing political economy of authoritarianism that shaped a regime's survival chances and operating environment would also apply after the digital turn. This article therefore considers the scholarship on economics in authoritarian regimes to be an important body of work for interpreting the political economy of digital authoritarianism.

The literature on how the politico-economic context of a state interacts with the survival agendas of authoritarian regimes – and the survival-seeking policy choices available to them – can be roughly split into three distinct themes. The first two, if deployed strategically, can significantly enhance a regime's grip over its population. The third represents a significant risk factor for all authoritarian regimes, which can catastrophically undermine regime stability and as a flow-on effect: its prospects of survival.

First, controlling a state's economy provides autocrats with financial levers that can be used to fortify their regime, shaping population behaviour by *rewarding supporters and incentivising regime loyalty.* This is a use of tools that create positive financial outcomes for those targeted, and can take place at both a population and individual level. A regime might develop economic policy to create a social contract with its population based on generous fuel[29] and food subsidies,[30] and the use of the public service as a major employer.[31] This social contract is often tied to a regime's ability to deliver financial stability over the long term – the most stable authoritarian regimes are more likely to pursue open trade policies that support long-term economic growth. Any flow-on distribution of wealth would generate buy-in from the population.[32] State economic success can also bestow "performance legitimacy" upon rulers.[33] Ruling parties may co-opt supporters by using state economic resources as "a virtually bottomless campaign war chest" during elections.[34] At the individual or group level, supporters may be given government scholarships,[35] lucrative privatization or franchising opportunities,[36] or senior positions within the state bureaucracy.[37] Regimes might plunder state coffers to build economic coalitions with chosen population groups.[38] This in some ways enables autocrats to "buy" a support base that has a shared interest in its survival,[39] and leads to outcomes in which the interests of the oligarchy and a regime become fundamentally intertwined.[40] The latter can however have adverse effects: encouraging the buy-in of private capital can also have the "potent political consequence … [of establishing] a space for bargaining and negotiation that may constitute a kind of proto-accountability."[41] As Richards and Waterbury wrote in 2008:

> This is quite new for paternalistic authoritarians who have regarded their citizens of all stripes as policy takers. Now certain citizens must be consulted in the formulation of policy, confidence in state adherence to laws and contracts must be established, and real legal recourse must be made available to aggrieved parties.[42]

Although such economic stakeholders are a significant source of regime stability, they also become powerful players whose needs must be continually met.

Second, controlling a state's economy provides a regime with *opportunities to coerce populations into supporting the regime*, or at least dissuade the population from actively opposing it. This contrasts with the first mechanism in that it uses economic tools to create negative financial outcomes for those targeted. Dictators may use coercive economics to shape citizen behaviour, such as denying non-compliant individuals or businesses access to public markets, or punishing them by imposing bureaucratic delays or red tape.[43] Licences or franchises may not be renewed, or individuals who are perceived as disloyal might be excluded from lucrative elite business circles and chambers of commerce. Businesses owned by people outside such circles may have their growth artificially limited by the regime.[44] Similarly, authorities can issue "fines" that threaten to bankrupt opponents or force them into exile. A state's taxation system is another powerful tool that can be weaponised against opponents, who may pay additional taxes, or fall victim to false (but serious) charges of tax fraud. They may be served insurmountable taxation debts.[45] One study found that autocrats use taxation strategically to "balance support and discontent from different groups."[46] Strategic and selective tax enforcement might also see a regime turn a blind eye to tax evasion in the short-term in order to collect material that it can hold over opponents as a threat in the future.[47] Indeed, coercive economic measures can be very targeted: Gallagher and

Hanson described China as "a complicated balancing act between measures that make opposing the ruler more costly and measures that reduce the expected gains of a successful overthrow."[48]

But a state's politico-economic context is not solely a driver of stabilization. Politico-economic forces can threaten the very survival of authoritarian regimes. This is the third key theme in the literature: being responsible for a state's economy also leaves regimes *vulnerable to being held responsible for the economic consequences of their policies*. In addition to the example noted above in which economic stakeholders inadvertently become a regime's political stakeholders, economic crises can sever the bonds between rulers and the economic stakeholders that underwrite them. This can prompt economic stakeholders to switch sides by backing alternative leaders.[49] Ill-executed policies such as the haphazard neo-liberalisation of the state can weaken the social welfare provisions that define the regime-citizen social contract.[50] Scholars have also found a direct relationship between high unemployment, high levels of education and political violence.[51] Even indicators of economic development that are usually considered a success such as a growing body of university-educated youth, the employment of women and urbanization "constitute profoundly destabilizing forces, which are hard to contain within authoritarian constraints."[52]

In this regard, the political economy of a state significantly shapes the operating environment of authoritarian regimes and determines the survival-driven policy choices that are available to it. Today, these policy choices often relate to digital authoritarian technologies. This article therefore proposes that these three broad areas of interaction between economics and authoritarian survival also act as mechanisms that influence the prospects for the implementation of digital authoritarianism. The final part of this section explains how these three mechanisms work through reference to already-known examples through which economics and digital authoritarianism have interacted.

The three politico-economic mechanisms that shape the implementation of digital authoritarianism

Mechanism 1: Economic tools can facilitate the implementation of digital technology in order to incentivise regime support and reward loyalty.

Controlling a state's economy provides significant opportunity for autocrats to deploy "carrots" that incentivise citizens to act in ways that enhance regime control. Examples include the granting of lucrative international technology franchises and privatized state telecommunications assets to members of the ruling family in Syria that enhance their buy-in in the status quo.[53] In Venezuela, the Sistema Patria app has become such a valuable tool of regime control that university professors who downloaded it received a bonus worth three-times their annual salary.[54] And while economics can be used to enhance technology uptake, as noted briefly above, technology can also bring economic benefits.[55] For example the implementation of e-governance portals can create significant economic efficiencies, and also deliver a veneer of good governance to a regime.[56]

Mechanism 2: Economic tools can coerce populations into using technology in a proscribed way in order to discourage dissidence.

Controlling a state's economy also provides significant opportunity for autocrats to deploy "sticks" that punish citizens or coerce them into submission. Tools such as

taxation can be enforced to disincentivise certain types of internet use, such as in Uganda where the government imposed a daily UGX200 (approximately US$0.05) "social media tax" on 58 platforms. Those platforms are blocked every morning for individual users until the tax is paid, leading to a 13 per cent reduction in Twitter users in Uganda.[57] Similarly, the ruling junta in Myanmar doubled the cost of data in 2021 to decrease the "effects triggered by extreme use of internet services on the employment of the people and mental sufferings of new generation students."[58] In Zimbabwe, the government increased internet prices by 500 per cent "to limit access to the internet and social media services."[59]

Mechanism 3: Vulnerability to being held responsible for ill economic effects that relate to the rollout of technology or technology strategy

While the interaction between economics and technology can empower authoritarian regimes, it also creates risks. Using economic tools to shape technology-use can backfire: This was seen in Mozambique after the government hiked phone and internet fees in an election year, prompting thousands to protest in the country's capital Maputo. The government was ultimately forced to reverse the decision.[60] When it tried to impose internet shutdowns after the election took place, it inadvertently mobilized a new anti-regime constituency by war of the business community, who protested the the economic cost of the internet disruptions.[61] This is not an issue unique to Mozambique: In 2024, internet shutdowns cost the Russian economy USD$4.01 billion, with consequences for the entire population.[62]

Indeed, while autocrats across the globe are implementing ambitious digital authoritarian agendas, they do not have carte blanche to do so because digital authoritarianism is firmly embedded in the longstanding politico-economic operating context of the authoritarian state. The following sections illustrate and operationalize this mechanisms through observation of Iran.

Scope conditions and limitations

The three mechanisms were designed to broadly understand how the politico-economic forces inside authoritarian regimes operated before and during the digital era, but there are some limitations to their scope. First, while only one mechanism may be visible at times, in other cases the implementation of an economic tool could reward supporters (mechanism one) while also creating an economic backlash from another constituency (mechanism three). As a result, the mechanisms may overlap. Second, as noted above, a state's political economy is historically contingent and context-specific, which means that not all mechanisms will apply to all regimes, nor will they be equally used. Given their rooting in the literature on the political economy of authoritarianism and the direct line that can be drawn between historical authoritarian survival strategies and the digital turn, this article nonetheless expects that the mechanisms will be informative for understanding technology agendas in most authoritarian regimes.

Case selection and background

Case selection and methods

A single case study research design was chosen because the complexity of digital authoritarianism and the historically and geographically contingent nature of the

political economy of any state requires detailed case analysis and deep contextual knowledge. As Boas noted decades ago, the internet too is highly context-specific, depending on the "political, economic and social conditions that prevail" in any given state.[63] Qualitative single case studies excel at exploring such topics because they can provide "deep understanding of a particular social setting" and "contextual insight."[64] They provide "direct knowledge about national politics and the actors, institutions, and movements that shape it" in a way that multi-case or quantitative studies struggle to do.[65] An alternative approach with multiple case studies would simply not be able to capture the level of granular detail required to answer the research question within the word constraints imposed by this journal.

Iran was chosen because it is an "extreme case" of digital authoritarianism. It has one of the most established and ambitious technology agendas of any authoritarian state on the planet at a time when many other states are just beginning to explore the full potential of digital authoritarianism, and are looking to states such as Iran as a "model."[66] Extreme cases are ideal sites for observing new phenomena because as Seawright argued, they offer the "best chances of facilitating discovery."[67] Given the newness of this area of research, Iran's status as a leading digital authoritarian state with an established technology agenda provides a key opportunity to illustrate and exemplify the article's three mechanisms.

This is not to say that the findings from a single case study do not have broader relevance or generalisability, particular when based on a conceptual frame such as the three mechanisms proposed in this article. Iran is an illustrative site of research on the political economy of digital authoritarianism because while China has attracted much more scholarly attention,[68] China has achieved such an extreme level of technology-control that its practices are beyond the reach of most authoritarian states. This to an extent limits its comparative value. Iran, and particularly the economic aspect of digital authoritarianism, is comparatively understudied, but with levels of malevolent technology-use similar to states such as Russia, Venezuela, Myanmar and Saudi Arabia, understanding Iran's experiences can offer significant insight into how pre-existing dynamics of authoritarian economics shape technology-use in other such "like" jurisdictions.

The article's findings are drawn from open-source research undertaken in English and Persian, which were all available online at the time of writing. Given the decentralized and scattered nature of primary knowledge on digital authoritarianism in Iran and the newness of this particular area of enquiry, the author cast a wide net, conducting extensive searches in order to consult each and every source she could find across English and Persian.[69] This covers a time period from the early 2000s when the Iranian regime began to pursue digital authoritarianism, until today (2025). It includes articles published in the Iranian press (with newspapers intentionally sourced from across the political spectrum and analysed in this context), Iranian government websites, sensitive communications between technology companies and the regime that have been leaked, publications by Iranian statistical agencies, and reports published by digital rights NGOs. Persian language sources were located and translated by a trusted political science PhD-qualified research assistant, with whom the author has had a long working relationship. The sources that ultimately shaped the article's findings were carefully considered for credibility, bias and agendas. Any primary source material included below was carefully triangulated with other sources to ensure accuracy. The exclusion of sources however was not black and white. While Iranian state media may not be a

reputable source of facts, its direct link to the regime's political agenda means that it can provide strong insight into how the regime feels about certain issues. In this regard, the findings below are the outcome of the careful and nuanced use of source material.

Defining the Iranian regime's technology agenda

The Islamic Republic of Iran came into being following the 1979 Iranian revolution, which overthrew the US-backed Shah Reza Pahlavi, and established the current regime under the leadership of Ayatollah Khomeini, the state's first "Supreme Leader." While the Islamic Revolutionary Guards Corps (IRGC) was established as a powerful para-state militia charged with protecting the theocratic regime (as opposed to the state), the regime has still faced constant domestic and international threats (some real, some confected) that has left it almost singularly focussed on survival. It is in this context of perennial regime insecurity that the Iranian regime has developed its technology agenda. Michaelsen argued that the regime "perceive[s] the Internet as a strategic battleground for regime stability."[70]

Iran's technology agenda is broadly made up of three key elements that the regime views as key to ensuring its survival in the digital world: information and population controls, surveillance and cyber sovereignty.[71] First, it uses tools to restrict its population's access to online material and networking opportunities that could create political instability. This has led to the deployment of tools such as content filtering systems that track content and block websites including Twitter and Facebook. Resultingly, Iran has one of the most restrictive internet ecosystems on the planet. When such blocks are deemed insufficient during major protest events, the regime implements shutdowns that disconnect Iranian citizens from the internet entirely. The regime also undertakes Information Operations on social media platforms domestically and internationally to disseminate pro-regime narratives and counteract other material available online.

The second key element of the regime's technology agenda is its use of technology to undertake surveillance of the Iranian population to ensure their acquiescence and stamp out dissidence. This has led to significant digital surveillance both on the internet and in real life, using a range of software tools, as well as hardware such as artificial-intelligence powered "smart" cameras that enable populations to be tracked in real-time.

The third element of the Iranian regime's survival-driven technology agenda is its pursuit of cyber sovereignty, a term that refers to states' efforts to hermetically seal "virtual" borders to gain complete control over their population's access to foreign online material, similar to the way physical borders are policed.[72] It is the gold standard of internet control, which has been mostly achieved in China's Great Firewall or North Korea's Kwangmyong. States such as Iran or Russia are aggressively pursuing the goal.[73] To this end, Iran conceived the National Information Network (NIN) in 2005.[74] Viewed as a domestic intranet that would operate in parallel to the World Wide Web, it aimed to give the regime unprecedented control over the way that Iranians use the internet by allowing access to approved local sites and resources. Everything else would have to be hosted externally on the World Wide Web, access to which would be heavily filtered, and could be disconnected during protests. The NIN goes hand-in-hand with the establishment of an application and ecommerce ecosystem that is developed and owned by local companies. This cyber sovereignty agenda has

been partially implemented, and the regime hopes that its domestic offerings will eventually be able to meet the entire online needs of government, businesses and individual end users.

As is typical with digital authoritarianism globally,[75] the private sector is a key partner in all aspects of the Iranian regime's technology agenda. Major telecommunications infrastructure, including the state-owned Telecommunications Company of Iran was privatized into the hands of IRGC-affiliated businesses,[76] while key international technology contracts are frequently distributed to individuals or companies closely linked to the regime.[77] Similar to China and Russia, the private sector has been a major source of Iranian technology innovation. Given the highly sensitive nature of technology in Iran and the political economy of privatization, almost every successful private technology company has members of the regime elite, regime loyalists or regime-adjacent bodies involved in its management. This endows Iran's technology agenda with significant politico-economic complexity.

The three mechanisms of the political economy of digital authoritarianism in Iran

This section explores the three mechanisms through which the long-observed political economic dynamics of authoritarianism have also shaped the Iranian regime's efforts to deploy digital authoritarianism. The first section examines how the state's politico-economic context has spurred the regime's pursuit of cyber sovereignty (mechanisms one and two). It then examines how authoritarian economics is placing sharp curbs on the regime's ability to control how its population uses technology (mechanism three).

Mechanisms one and two: enabling an ambitious technology agenda

Iran's cyber sovereignty agenda, including the implementation of the NIN and domestic app ecosystem, has been beset with problems, including cost blowouts and delays. The regime has also struggled with low user uptake, with one 2015 survey finding that Iranians felt safer using foreign social media sites.[78] Some local providers such as Digi-Kala and Snapp, whose international rivals Amazon and Uber cannot operate in Iran due to international sanctions, are extremely popular.[79] Other apps whose foreign counterparts are ubiquitous in Iran have struggled, even when those foreign apps are banned by the regime and can only be accessed via cumbersome, costly and unreliable Virtual Private Networks (VPNs). For example, the instant messaging app Soroush, which was released in 2018 to replace WhatsApp and Telegram, purportedly attracted just two per cent of Iranian social media users in its first year of operation, even though the regime had withdrawn Telegram's operating licence.[80] The state-run *Fars News* reported in 2020 that more than half of the population were still using Telegram, with Persian-language Telegram channels posting 500 million posts annually.[81] Without significant intervention, the regime's cyber sovereignty agenda was doomed to remain little more than a pipe dream.

Cognisant of these challenges, the regime has relied heavily on its economic toolbox to incentivise, co-opt and coerce Iranians into using the NIN and its local app ecosystem. This includes manipulating internet pricing. In 2016, ISPs began offering discounts or free access to users of three approved domestic Video on Demand (VoD) sites, including Aparat (the local competitor to YouTube) and Filmio (the Iranian

version of Netflix).[82] This echoed the Russian approach noted above in which economic incentives were being used to create "ideal" netizens. By 2017, more than 200 Iranian websites could be accessed at a lower cost.[83] Today, websites hosted on the NIN cost half as much to access, which is a particularly powerful strategy in the context of the high cost of the internet relative to average wages in Iran.[84] Echoing the strategy of the regimes in Myanmar and Zimbabwe, the regime increased the cost of the external internet by 34 per cent after the 2022–3 country-wide protests (mechanism two). In response to criticism, the Minister for Communications and Information Technology explained on Virasty (the Iranian version of Twitter): "the increase in internet package prices … does not apply to domestic traffic."[85]

The manipulation of domestic internet pricing is a powerful tool because it not only shapes consumer behaviour, but also effectively coerces Iranian businesses into hosting their websites locally as it makes little business sense to ask price-sensitive customers to pay twice as much to access foreign-hosted websites that could easily be hosted locally (mechanism two). The regime also intentionally delivers foreign-hosted content at slower speeds than the NIN. Indeed, as the digital rights NGO Article 19 argued "such subsidisation schemes … could make the National Internet versions of common Internet services the 'path of least resistance' for Iranian users."[86] The dual pricing policy has the added effect of punishing Iran's tens of millions of VPN users, who cannot access discounted data.

Indeed, population-level economic tools such as internet price manipulation highlight the continued relevance of pre-existing politico-economic levers that facilitate authoritarianism. In this case, they incentivised Iranians to act as "model" online citizens, rewarding "good" citizens and excluding others. This exemplifies the first two mechanisms through which the political economy of a state can interact with digital authoritarianism as enablers of the regime's technological agenda. In some cases the strategy worked: the Iranian video-hosting website Aparat quickly became one of the most popular websites in Iran.[87] With site content strictly monitored and controlled, Aparat gave the regime the ability to cultivate its citizens' internet viewing in a way that had not existed since the pre-internet and satellite television era, representing a boon for its regime fortification agenda.

The regime has also relied on the long-established politico-economic strategy of providing financial inducements (mechanism one) that encourage developers to create higher quality local apps in order to increase uptake. It has directly funded the development of apps and websites, including domestic search engines.[88] Iranian developers have received performance incentives to improve product offerings,[89] while companies whose products reach certain success thresholds have become eligible for lucrative banking or e-government service licences. In 2017, the regime announced that regulatorily compliant local messaging apps with more than one million users would receive a US$260,000 grant. This would be doubled for those who increased their userbase from one million to two million, and a further US$260,000 was distributed to developers whose apps reached five million users. These measures were often implemented alongside repressive tools such as the blocking of the foreign Telegram messaging app noted above. The subsidy scheme had the added benefit of rewarding the regime's economic stakeholders in the ICT industry by distributing grants that enhance their stake in the regime's digital authoritarian agenda.

In this regard, the long-established political economy of the Iranian state has provided the regime with a series of tools that directly facilitate the implementation of its

technology agenda. Mechanism one was visible through the use of discounted local internet data and industry subsidies that sought to incentivise uptake of the regime's cyber sovereignty tools, and reward regime loyalists in the technology industry. They often went hand-in-hand with tools of coercion (mechanism two), which punished VPN users and saw price increases levied on foreign internet access. Combined, these two long-standing politico-economic strategies of authoritarianism proved a powerful enabler of the regime's ambitious cyber sovereignty agenda, enhancing its control over its population and ultimately, its chances of survival.

Mechanism three: limiting the implementation of digital authoritarianism

While the political economy of authoritarianism has supported the Iranian regime to achieve aspects of its digital agenda, it has also acted as a barrier to its full implementation. In Iran, the regime's decades-long privatization and securitization of technology businesses created major politico-economic stakeholders in the country's ICT industry, fomenting a level of "proto-accountability"[90] through which technology policy had to be calibrated. The regime's implementation of technology would inevitably impact this dynamic in both lucrative (as outlined above) and costly ways. This section examines the third mechanism of the political economy of digital authoritarianism through cases in which the implementation of the regime's technology agenda has inadvertently undermined its political stability.

Mechanism three has been particularly visible through the regime's use of internet shutdowns. Internet shutdowns are widely used by authoritarian regimes, with at least 283 instances of internet blackouts and 53 cases of platform blocking documented globally in 2023 alone.[91] In the 2022–3 Iranian protests, the regime relied heavily on its long-used tactic of shutting down the internet. While these shutdowns were significantly narrower than during previous crises because they took place largely on the city-level or at specific times of the day, the regime nonetheless shut down the internet 18 times between September 16th and December 31st 2022,[92] and a further 34 times the following year.[93] Disruptions took place in various forms, including the complete disconnection of the country from the international internet, the shutdown of cellphone networks, the deployment of a tool that prevents cellphones from connecting to anything other than slow and less-secure 2G frequencies, and the blocking of popular apps such as WhatsApp and Instagram. The extent of the disruption prompted some Twitter users to refer to ICT Minister Zarepour with the derogatory hashtag #وزیر_قطع_ارتباط (The Minister of Disconnection).

However, rather than merely quashing dissent, the shutdowns revealed the intense interplay between digital authoritarianism and the political economy of the Iranian state. Economic fractures began to appear between it and its ICT stakeholders (mechanism three) that risked creating a new opposition constituency. This was particularly acute among cellular service operators whose ability to provide services to customers (and thereby generate revenue) was directly impacted by the internet disruptions.

Iran's cellphone operator landscape had been liberalized in the mid-2000s, with operating licences distributed to various constellations of regime institutions and the country's political and economic elite in an effort to both give elites a further economic stake in the survival of the regime (mechanism one) and ensuring that privatized technology assets were safely held by regime loyalists. It is in this context of the shared

interest in regime survival that the responses of all three cellular providers to the 2022–3 internet disruptions was remarkable.

Just six weeks into the disruptions, the CEO of RighTel Yaser Rezakhah wrote an open letter to the ICT Minister Zarepour to complain about the impact of the digital crackdown on his business. Instead of privately communicating his concerns to the minister (which may also have happened), Rezakhah provocatively released the letter on RighTel's public-facing Telegram channel. He complained:

> The financial resources and revenues of RighTel have significantly decreased during the periods of internet service disruption and other restrictions. The reduction in internet bandwidth from September 21, 2022, led to a 50% drop in data service traffic under normal conditions.
>
> … As a result of these restrictions, data consumption and traffic have declined over the past weeks, effectively impacting half of RighTel's data service network capacity and thus affecting around 86% of its revenue sources. This has led to a daily revenue loss of 14 billion rials and a total revenue loss of approximately 302 billion rials in the first 21 days of the restrictions.[94]

Rezakhah underlined the key role that his company was playing in enforcing and supporting the regime crackdown, noting its "compliance with all prescribed security priorities and requirements, as well as its management of traffic and communication services based on the terms of the operating license agreement with the Communications Regulatory Authority." Requesting that the regime "compensate communication operators for financial losses during service disruptions due to political and security reasons," he explained:

> Considering and given that these restrictions are legally and practically attributed to governmental entities to safeguard public interests, I request that necessary measures be taken to compensate for the financial and commercial costs … such as reducing the government's revenue share from mobile operators, suspending urban, road, rural, and population development obligations.[95]

The nature of the public quarrel was notable in the context of the usually strong connection between RighTel and the regime, and Rezakhah's credentials as a veteran of the Iranian ICT industry.[96] He did not have a track-record as a regime critic. This frustration was soon echoed in leaked communications issued by the other providers, who also made demands for compensation.[97]

This backlash that followed the internet shutdowns highlighted the profound interaction between the political economy of Iran and the regime's technology agenda, and the precarity of the balance between the two: By inviting new economic stakeholders into its social contract (mechanism one), the Iranian regime became vulnerable to the interests of private capital. When those interests were neglected in favour of blunt internet shutdowns that aimed to preserve the regime, it inadvertently eroded its own support base (mechanism three). This is not a phenomenon that is unique to Iran. As noted above, ISPs in Zimbabwe and Russia have also expressed significant frustration at the cost of internet disruptions. It was also not a new phenomenon: these dynamics that had long been central to the political economy of authoritarianism.

Yet it was not just the regime's elite that were economically impacted by digital authoritarianism during the 2022–3 protests: internet shutdowns also had significant flow-on effects at the population level. While economic figures in authoritarian

regimes are difficult to verify, the government's E-Commerce Development Centre estimated that Iranian business revenue derived between USD$595 and USD$833 million in sales from social media sites in 2021 alone.[98] Given that an estimated 83 per cent of online businesses in Iran make sales on Instagram, Telegram and WhatsApp,[99] many were directly impacted. One report found that Instagram filtering and periodic internet shutdowns in the 17 months after the 2022–3 protests began cost the Iranian economy US$1.6 billion.[100] The scale of the disruption was echoed in technical data that suggested that there was a 50 per cent drop in the volume of online payments inside the country in the first two weeks of the protests alone.[101]

These impacts went well beyond the e-commerce sector. All businesses lost their ability to use foreign enterprise applications such as Slack, Skype, Google Meet or Jira for internal staff communications, as well cloud-hosted developer tools such as GitHub.[102] Efforts to disrupt VPNs and secure HTTPS connections led to problems with corporate payment systems, multi-factor authentication, email services and other technologies that are fundamental to contemporary business operation.[103] Indeed, while the NIN is designed to help reduce the cost of such disruptions by making the country entirely self-sufficient, it was clear that Iranian businesses' reliance on internationally-delivered cloud-based software and systems further exacerbated the economic costs of the shutdowns.

In the context of the country's economic crisis, which existed independently of the 2022–3 protests, it is difficult to overstate the significance of these disruptions, or the risks they pose to the stability of the Iranian regime during a time of pre-existing political and economic crisis. Implementing internet shutdowns in Iran was not an impact-neutral measure, and its far-reaching and blanket economic consequences risked further heightening tensions in Iran and spurring the mobilization of new anti-regime cohorts onto the streets at a time when the regime was already facing one of the most serious existential threats of its lifetime.

In this regard, internet shutdowns highlighted the continuation of the pre-existing economic dynamics that shape authoritarian regimes, and the profound enmeshment between digital authoritarianism and the political economy of Iran. While the regime had long leveraged the economy to underwrite its stability, including by offering loyalists key economic opportunities in the ICT sector, these dynamics also provided a significant limitation on its ability to achieve its full survival-driven technological agenda (mechanism three). Even though the shutdowns were far less blunt than during previous crises, they caused significant opposition that may further reduce the ability of the regime to use shutdowns as a tool of population control in the future. Indeed, digital authoritarianism does not exist a vacuum in which regimes have a limitless capacity to deploy technology. Its implementation must be calibrated in line with a state's long-established politico-economic milieu, which will often place fundamental limitations on a state's ability to fully achieve its technological goals.

Conclusion

The Iranian regime has one of the most sophisticated and ambitious survival-driven technology agendas in the world. Its advanced digital authoritarian playbook, particularly its relatively mature cyber sovereignty agenda, made Iran an instructive case study of the interaction between digital authoritarianism and the political economy of the Iranian state.

This article proposed that the longstanding politico-economic aspects of authoritarianism also interact with digital authoritarianism through three mechanisms. The first mechanism saw the deployment of e*conomic tools to facilitate the implementation of digital technology*. This was particularly evident through the regime's cyber sovereignty agenda, the realization of which could not be taken for granted in the context of Iran's technologically discerning citizenry. In response, the regime has deployed economic carrots to induce behavioural change and reshape the Iranian population as "model" online citizens. It has also provided incentives to its own regime-adjacent stakeholders in the industry to enhance their buy-in in its cyber sovereignty agenda. Yet it also deployed a series of "sticks." The regime also used *economic tools to coerce populations into using technology in a proscribed way in order to discourage dissidence* (mechanism two), punishing VPN users and imposing higher pricing for those accessing foreign internet data. Combined, the two mechanisms highlight how the existing political economy of authoritarianism was supporting the cyber sovereignty aspect of the regime's digital authoritarian agenda. If achieved, cyber sovereignty will enable the regime to fortify itself by sealing its virtual borders and isolating Iran foreign digital threats and tools that could undermine its grip on power.

But the significant role of the third mechanism highlighted that authoritarian regimes do not have a limitless capacity to implement digital authoritarianism because of the pre-existing politico-economic dynamics that shape the regime's operating environment. Digital authoritarianism is not impact-neutral, and over-reach has already destabilized the Iranian economy and created fractures between the regime and its stakeholders. Internet disruptions have threatened to unravel the contingent nexus between the regime's economic stakeholders in the quasi-private technology sector, and risks mobilizing further opposition among the broader population. This not only weakens the regime's ability to achieve its digital authoritarian agenda, but also undermines its primary goal of regime fortification and survival.

This case study of the political economy of digital authoritarianism in Iran provides two key lessons for the study of other advanced authoritarian regimes such as Russia, Venezuela and Saudi Arabia. First, digital authoritarianism is subject to the same politico-economic constraints that shape the operating environment of other aspects of the authoritarian state. While authoritarian regimes appear much changed amid the spectacle of cutting edge technology, the core tenets, features and limitations of authoritarianism remain mostly constant, and so too define the political economy of digital authoritarianism.

Second, the implementation and success of a regime's survival-driven technology agenda is shaped and bound by the complex and longstanding politico-economic context that defines an authoritarian operating environment and limits a regime's ability to exercise complete control. In this regard, the politico-economic forces that define a regime's operating environment infer significant limits on technology implementation because of the inadvertent and often-negative economic consequences of technological tools. This dynamic is sharpened by the reality that technological development in most contemporary authoritarian regimes is being facilitated by complex and nebulous relationships between the private and public sector. The most ambitious digital authoritarian agendas therefore raise new areas of economic risk and destabilization, and may never be fully achievable in states such as Iran.

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