**TECHNOLOGY AND HEGEMONY: THE HISTORICAL EVOLUTION OF GLOBAL POWER MODELS FROM ROME TO THE DIGITAL AGE**

**ABSTRACT**

This article explores the decisive role of technology in the construction of hegemony throughout history, from the Roman Empire to the United States. It argues that global leadership cannot be explained solely by military and economic balances of power; technological innovations also generate logistical superiority, effective communication networks, and ideological legitimacy.

During the Pax Romana, the Roman Empire utilized road systems, aqueducts, and military logistics to consolidate its authority over vast territories, while fostering economic and social integration. The British Empire, with maritime technology, steamships, and the telegraph, became the hub of global trade networks in the 18th and 19th centuries, establishing an empire “on which the sun never sets.” In the contemporary era, the United States has built its dominance on control of digital infrastructures such as the internet, GPS, and semiconductors, becoming the most decisive global order-builder of the post–Cold War period.

The article integrates Hegemonic Stability Theory, neo-realism, and historical sociology to address two key questions: (1) Is technological superiority as decisive as material power in constructing hegemony? (2) What points of continuity and rupture exist between Rome, Britain, and the United States?

Findings indicate that technology is not merely a tool for military and economic advantage but a strategic driver of global norms and legitimacy. The study contributes an interdisciplinary perspective to debates on historical hegemony and provides insight into contemporary challenges, particularly China’s rising influence in 5G, artificial intelligence, and space technologies.

**Key Words:** Hegemony, Technological Superiority, Historical Sociology, Global Leadership Models, Digital Networks

**Introduction**

How leadership is constructed and sustained at the global level is one of the fundamental questions in international relations literature. Within this framework, hegemony is a multilayered phenomenon that cannot be explained solely by military or economic capacity. Historically, hegemonic powers have transformed themselves into global order-building actors not only for the purposes of winning wars or achieving production superiority, but also by strategically using technology in areas such as establishing communication networks, directing information flows, building infrastructure, and generating ideological legitimacy. Therefore, technology has become a central element of both material power capacity and normative leadership.

This study aims to reveal the role of technology in the construction of global leadership by examining how historical forms of hegemony are intertwined with technological capacity. Three historical examples illustrating the transformation of the relationship between hegemony and technology in different periods are selected: the engineering and logistics systems of the Roman Empire; the maritime and communication technologies of the British Empire; and the dominance of the United States over digital infrastructures. Comparative analysis of these examples allows for an assessment of how hegemonic orders are shaped through the lens of technology. The research is based on historical-sociological analysis and comparative case study methods. The theoretical framework utilizes Hegemonic Stability Theory, a neo-realist approach, and historical structuralist analysis. Thus, a multidimensional approach addresses not only the balance of material power but also the relationship between technological superiority and legitimacy generation, norm construction, and systemic stability.

The article focuses on two fundamental questions:

(1) Is technological superiority as decisive a factor as material power in the construction of hegemony?

(2) What kind of continuity and rupture can be established between models of technological hegemony from Rome to the present-day United States?

Historical answers to these questions will contribute to our understanding of the dynamics of a new global power structure, particularly in the context of China's increasing role in areas such as 5G, artificial intelligence, and space technologies.

**Theoretical Framework: Hegemony, Power and Technology Relationship**

Hegemony has become a fundamental concept in the discipline of international relations, understanding the distribution of power, systemic stability, and norm production. Theoretical approaches, particularly those developed since the second half of the 20th century, have attempted to explain this phenomenon on various levels. Frameworks such as Hegemonic Stability Theory (HST), structural realism, historical structuralism, and soft power theory have formed the main pillars of the hegemony literature. These approaches enable the assessment of hegemonic power not only in terms of material capacities but also in institutional, normative, and technological contexts.

This study evaluates these theoretical approaches in a complementary manner to understand the multidimensional relationship between technology and hegemony. Technology is considered here not only as an instrumental capacity but also as a structural variable that plays a decisive role in norm production, digital surveillance, and the construction of information regimes.

***Hegemonic Stability Theory and the Institutionalist Interpretation***

Hegemonic Stability Theory (HST) is one of the most influential theoretical approaches arguing that the stable functioning of the international system depends on the existence of a hegemonic state. Charles Kindleberger's (1973) analysis of the 1929 Great Depression is considered a founding moment in the development of this theory. Kindleberger explains the deepening of the global economic crisis as a result of the absence of a hegemonic actor, arguing that elements such as international liquidity, open markets, and institutional coordination must be provided as public goods by a leading state (Meardon, 2014). Within this framework, the hegemon must undertake not only its own national interests but also the normative and structural functions that will maintain stability throughout the system. Kindleberger's approach is based on the assumption that the hegemon must not only be a rational leader but also a moral guarantor of order. Robert Keohane (1984) revisited this approach within a more institutionalist framework, exploring the possibility of "post-hegemonic cooperation." According to him, even in the event of a weakening of hegemonic power, cooperation can be sustained through institutional mechanisms. Keohane's neoliberal institutionalist interpretation argues that international institutions created by the hegemon can maintain regimes by acquiring "institutional independence." This interpretation removes the hegemon's production of public goods as an absolute prerequisite and explains the normative structure of the system within a more dynamic framework (Gruia, 2006).

The fundamental assumption of the HIT is that the hegemonic state produces public goods in areas such as free trade, security, and monetary stability, while tolerating the "free-riding" behavior of other states. In this respect, the theory focuses not only on the distribution of power within the order but also on the sustainability of systemic norms and cooperation models.

However, within this theoretical framework, the technological variable generally remains in the background. However, both Kindleberger's and Keohane's frameworks are actually indirectly dependent on technology: in the second half of the 20th century, the public goods provided by the hegemon began to be not only financial but also infrastructural (internet access, digital networking, communication systems). Therefore, modern interpretations advocate for a reevaluation of public goods within the framework of the concept of "technological public goods" (Farrell & Newman, 2019).

Especially in the digital age, where platform infrastructures, internet protocols, and cybersecurity standards are produced under hegemonic control, public goods have become operational not only through monetary policies but also through the establishment of the digital order. For example, the US's determination of global network standards through ICANN, the IETF, and actors such as Google, Amazon, and Meta can be interpreted as digital reflections of modern public goods. This demonstrates that the hegemonic state is no longer merely reshaping itself into a nation-state but is also reshaping itself through technological platforms.

***Structural Realism and the Emphasis on Material Power***

Structural realism is considered one of the most influential frameworks for explaining the hegemonic order in international relations theory. Developed by Kenneth Waltz (1979), this approach argues that states are forced to maximize their own security due to the anarchic nature of the international system. This enables powerful actors within the system to ascend to hegemonic positions over time. Structural realism primarily focuses on material capacity—military power, economic size, population, and natural resources—in explaining the behavior of states.

In this approach, technology is generally not directly analyzed; rather, it is indirectly considered as a subcomponent of material power capacity. For example, instruments such as nuclear weapons capacity, military technological superiority, or overseas power projection are viewed as technical/mechanical tools that determine a state's position in the system. In this sense, technology is considered an "instrumental" variable that determines the strategic balance, while its ideological or structural effects are overlooked.

Waltz analyzes the impact of technology on the system through its contribution to the state's distribution of power. According to him, nuclear balance can limit the possibility of hegemony because the capacity for mutual destruction among great powers fosters balance (Waltz, 1981). However, structural realism remains insensitive to the "soft" dimensions of technology, such as knowledge production, agenda setting, and norm creation. This reveals the inadequacies of realism in its analyses of technology-based hegemony.

Post-Waltz structural realists have rethought technology more in the context of cybersecurity, space weaponry, and surveillance systems. In particular, in current developments such as the Sino-US rivalry, the quest for strategic advantage through digital infrastructures (e.g., 5G technologies, quantum communication, artificial intelligence-based weapons systems) has necessitated the evaluation of technology not only as "hardware" but also as a "strategic field" (Lanoszka, 2015).

Therefore, structural realism's view of technology solely as a capacity-enhancing tool falls short in explaining today's digital hegemony processes. Although technological capabilities are taken into account in analyses of states' power distribution, their transformative effects on knowledge production, social influence, and normative spheres are often overlooked.

***Historical Structuralism and Ideological Hegemony***

The historical structuralist approach considers hegemonic power not only as a form of superiority based on material resources, but also as a structural field of dominance where ideological, cultural, and normative assumptions are reproduced. Robert Cox (1987), a key representative of this approach, argues that the hegemonic order is established not only through interstate relations but also through relations of production, information systems, and institutional structures. As Cox famously noted, "problem-solving theories" serve to legitimize the functioning of the system. In contrast, "critical theories" aim to uncover the historical and social power relations behind the hegemonic structure.

In this context, technology should be considered not merely a means of production or transportation, but also as an ideological carrier that structures knowledge, manages perception, and reproduces normative values. Infrastructure technologies, in particular (e.g., roads, maritime, and communication systems), construct not only a physical but also an epistemic space. Castells's (1996) concept of "network society" offers a complementary framework for understanding the ideological dimension of this technological transformation. Today, where information production is centralized through digital media and individuals' perceptions are directed through platforms, technological systems have become not only material but also constitutive elements of ideological power.

Historical structuralism also emphasizes that hegemonic power produces "consent" through educational systems, cultural production mechanisms, and the circulation of information. At this point, Gramsci's concept of "cultural hegemony" intersects with Cox's structural analyses. The hegemonic order is maintained not only through coercion but also through knowledge regimes that permeate the daily life practices of large segments of society (Cox, 1983). In this case, technological tools—such as the telegraph, printing, radio, or digital algorithms, depending on the historical context—play a strategic role in the reproduction of the hegemonic order. According to this approach, hegemony in the digital age is shaped not only by technical issues such as cybersecurity or data ownership, but also by who sets digital agendas, what information circulates, and what values platforms make visible. Therefore, historical structuralism conceptualizes technology not merely as a factor that increases production capacity but also as a tool of hegemony that reshapes the ideological field.

***Soft Power, Smart Power, and the Digital Age***

One of the key contributions that adds a cultural and normative dimension to discussions of hegemony is Joseph Nye's (2004) theory of "soft power." Nye argues that a state can influence other actors not only through military or economic means, but also through its cultural values, political norms, and international legitimacy. In this context, media, digital platforms, and information technologies emerge as the most decisive tools of contemporary hegemonic power. Soft power enables the shaping of minds and preferences, particularly through the global circulation of cultural content.

Today, platforms such as Netflix, TikTok, Twitter/X, and Meta are not merely entertainment or communication tools; they are also carriers of global value transfer and normative influence. The discourses, lifestyles, political trends, and popular cultural content disseminated through these digital platforms create a sphere of influence that transcends the traditional diplomatic tools of states. Thus, in the digital age, soft power is evolving into a form of hegemony that can be wielded not only by states but also through platform companies.

Nye's later development of the concept of "smart power" suggests a strategic combination of hard and soft power (Pallaver, 2011). In this model, technology functions both as a tool for generating attraction and as an element for exerting strategic pressure. The use of algorithms, content recommendation systems, and digital censorship mechanisms demonstrates that platforms function not only for communication but also for perception management. Within the framework of innovative power strategies, technological superiority is now constructed beyond military capabilities, through control of digital access spaces, manipulation of data flows, and the generation of algorithmic prestige.

This transformation, unlike classical forms of hegemonic power, shapes its influence through new tools such as user experience, digital infrastructure ownership, and cyber diplomacy. Thus, in the digital age, hegemony is maintained not only through weapons or ideological discourses but also through the attention economy, information access protocols, and content curation.

***Criticisms and Alternative Approaches***

While the WTO maintains that the hegemonic state is the actor that ensures systemic stability, this approach has been subject to numerous criticisms. Snidal (1985) argues that international cooperation can be sustained without hegemony and that states can establish rational collaborations based on mutual interests. Silvia and Stanaitis (2013) have demonstrated, using empirical data, that economic openness is not only achieved through hegemonic leadership, but that multipolar structures can also support openness. Gavris (2019) has noted that the concept of hegemony is often defined retrospectively, undermining the scientific testability of the theory. Furthermore, Kindleberger's approach, based on historical analysis, has been criticized for failing to adequately account for the normative and cultural dimensions of hegemonic power.

This theoretical framework, built on the relationship between hegemony, power, and technology, offers a multidimensional reading of WTO, neo-realist analyses, historical structuralism, and soft power theory. These approaches demonstrate that hegemonic power is sustained not only through material but also ideological, cultural, and technological resources. Thus, technology plays a central role in both the establishment and transformation of the hegemonic order.

**Historical Case Studies**

***The Roman Empire: Hegemony Established through Infrastructure and Logistics***

The Roman Empire is one of the early and founding examples of the historical concept of hegemony. This hegemony was based not only on military conquests but also on the advanced technological, logistical, and administrative capacity that ensured the sustainability of these conquests. Rome positioned technology not merely as a tool of war, but as a building block that institutionalized the physical, ideological, and cultural dimensions of the hegemonic order. In this context, Rome's infrastructure strategies formed the basis of a system of sovereignty that enabled the extension of central authority to the peripheries.

The Roman road network (viae), with its approximately 400,000 kilometers of length and systematic organization, served not only as a means of transportation but also as a political and economic artery that carried the empire's central power to peripheral areas (Bekker-Nielsen, 2021; Kolb, 2019). This network enabled the rapid deployment of legions, ensured the security of trade routes, maintained communication continuity, and enhanced the administrative efficiency of tax collection. Thanks to these roads, legions could travel thousands of kilometers in short periods, provincial rebellions were quickly suppressed, and loyalty to Rome was reinforced (Hingley, 2005).

This infrastructure was the product not only of top-down planning but also of a flexible system developed in collaboration with local actors. Local governors and cities, as well as emperors, played an active role in shaping this network (Rathmann, 2014). In this respect, the road network also reveals the pragmatic balance Rome established between its desire for centralized control and local autonomy.

An integral part of the infrastructure, the vehiculatio system was Rome's state-supported communication and transportation network. Thanks to this system, official documents, administrators, and orders were delivered securely and quickly throughout the empire (Gentry, 2015). This practice not only ensured administrative coordination but also contributed to the reproduction of hegemonic legitimacy by increasing the visibility of central authority through continuity in communication.

Rome's military logistics systems were highly organizationally capable, encompassing the entire process from planning large-scale campaigns to long-term occupations. Flexible strategies, including supply lines, ration planning, foraging, and the integration of local resources, ensured a sustainable military presence across diverse geographies (Roth, 1998; Matías, 2017). The ability of the logistics system to function without major changes, even during periods of crisis, is a key indicator of Rome's administrative resilience (Olshanetsky, 2024).

Aqueducts, sewer systems, and irrigation infrastructure were fundamental components of Rome's urbanization policies. These structures not only supported public health but also served to carry Rome's "standard of civilization" to the peripheries, becoming a tool for the production of cultural hegemony (MacDonald, 1982; Baltrusch et al., 2016). These engineering marvels symbolized Rome's status as not only a physical but also a cultural empire.

The Pax Romana period, from 27 BC to 180 AD, illustrates the transformative impact of Roman infrastructure on the hegemonic order. Low levels of conflict, increasing economic integration, and cultural interaction are distinctive elements of this period. Road networks, water infrastructure, and logistics systems formed the material basis of this peaceful environment; Hegemony was institutionalized not only as a coercive but also as a regulatory power (McShane, 2002; Laurence & Adams, 2001). The Roman Empire's hegemonic power was institutionalized not only through military force but also through its infrastructure and logistical systems, which perpetuated this power. Technological tools such as roads, water systems, transportation, and communication networks enabled the production of ideological and cultural legitimacy, as well as physical dominance. In this respect, Rome systematically established the relationship between hegemony and technological infrastructure early on, providing a historical model for later civilizations.

***The British Empire: Hegemony Established by Shipping, Telegraph, and Industry***

From the late 18th century onward, the British Empire emerged as the first global hegemonic power of the modern era, thanks to the production capacity, naval power, and communication technologies it developed with the Industrial Revolution. This hegemony was reinforced not only by military expansionism and colonial domination but also by a structural superiority based on technological innovation, engineering prowess, logistical organization, and information control. As Cox emphasizes in his historical structuralist approach, this order was intertwined with production relations, information systems, and material elements (Cox, 1987).

The key element that enabled Britain to dominate global production and trade systems was the technological superiority it achieved through the Industrial Revolution. Steam engines, railways, textile production systems, and factories not only increased economic productivity in Britain; these technologies were also transmitted to the colonies, establishing a British-centric economic order (Allen, 2020; Ferguson, 2003). The connection of industrial infrastructure to colonies like India reinforced Britain’s capital accumulation and global financial dominance (Mukherjee, 2010). Britain, which replaced the Netherlands in the 18th century, brought financial innovations to London, establishing itself as a global financial center (Betz, 2016).

A strong maritime infrastructure was a key pillar of Britain’s hegemonic capacity. The Royal Navy served not only as a military force but also as a technological platform, ensuring the security of global trade and controlling the empire’s transportation and supply routes (Redford, 2014; Spence, 2015). Steamships and long-range merchant fleets enabled Britain to establish a permanent and strategic presence overseas (Pomeranz, 2000). Naval expeditions were also areas where hegemonic influences were generated, particularly in the dissemination of scientific knowledge and cultural representation (Killingray et al., 2004).

Britain’s superiority in communication became systematic with the development of its telegraph infrastructure. The first transatlantic telegraph line, laid in 1858, demonstrated that Britain had established a global hegemony not only physically but also cognitively and administratively (Standage, 1998; Headrick, 1988). This system enabled the transmission of executive orders and military coordination across continents in minutes, significantly increasing the empire’s administrative efficiency (Winseck, 2019). Standardization efforts in electrical engineering and communications also laid the technical foundations of this cognitive infrastructure (Giuntini, 2022). The telegraph network, although sometimes expensive and unreliable, was an important tool in strengthening imperial nationalism and intra-empire connections (O’Hara, 2010).

Britain's investments in technological infrastructure transformed not only the central order but also the structures at the periphery. This transformation led to the reshaping of local production and consumption patterns, as well as the weakening of traditional governance structures (Judd, 1996). While the empire's logistics and information systems sometimes legitimized the arbitrary exercise of central power, they also laid the groundwork for local resistance and cultural transformations. Systems such as the telegraph, despite their revolutionary impact, occasionally led to a return to traditional methods, creating a dual interaction between technological hegemony and local practices (O'Hara, 2010).

The British Empire's hegemonic power was constructed in a multilayered manner, encompassing the production capacity gained through the Industrial Revolution, the logistical superiority established through its extensive sea routes, and the information dominance provided by its telegraph systems. For Britain, technology was not merely a tool for economic or military competition; it became a hegemonic capacity that established, reproduced, and legitimized the global order. In this respect, the British Empire was one of the first examples of laying the institutional foundation for the modern hegemony-technology relationship.

***The United States: Hegemony Established through Digital Networks***

Since the second half of the 20th century, the United States (US) has redefined the global hegemony model not only through its military and economic capacity but also through its institutional and normative dominance over technological innovation, digital networks, and information infrastructure. With the emergence of the post-Cold War unipolar world order, the US's pioneering use of digital technologies has enabled a multilayered power architecture that transcends the classical understanding of hegemony (Nye, 2004).

This digital hegemony operates as a multidimensional system encompassing control of physical infrastructure, corporate domination through multinational technology corporations, information control through surveillance systems, and ideological dissemination through cultural platforms. As Robert Cox emphasizes in his approach to structural hegemony, this power generates legitimacy not only at the material but also at the ideological and cultural levels (Cox, 1987).

The US's digital hegemony process began with the development of state-supported internet infrastructure. The internet's origins lie in the US Department of Defense's ARPANET project, and even the earliest forms of digital communication were constructed directly as strategic hegemonic tools (DeNardis, 2014). With the commercialization of the internet in the 1990s, infrastructure control shifted to the private sector; however, root DNS servers, fiber optic transit hubs, and a significant portion of the global data flow remain US-centric (Edmundson et al., 2018). Through this infrastructure, the US has not only shaped the digital economy but also created an infrastructural dependency relationship in the Global South. The digital divide has increased the dependence of developing countries on US technology, generating a new form of digital colonialism linked to both economic inequality and data exploitation (Chandani, 2017; Kwet, 2018).

American-based multinational corporations such as Google, Apple, Amazon, Facebook, and Microsoft go beyond the technical dimensions of digital infrastructure to control cultural production, data management, and algorithmic governance on a global scale (Klikauer, 2021; Winseck, 2019). These corporations are not only market actors; they are also hegemonic tools that influence political, cultural, and economic decisions.

The US is also a pioneer in the surveillance capitalism model. The massive data sets collected through corporations serve both to concentrate economic power and to facilitate state surveillance, particularly in developing countries (Kwet, 2018). This system is a new form of power that demonstrates how technological power combines with geopolitical and social control.

US digital hegemony is shaped not only by technical superiority but also by its influence on global governance systems. International internet governance, cybersecurity standards, digital rights, and privacy norms are primarily built on the foundation of the American legal system and liberal principles (Bader, 2019). This governance framework is often disseminated through aid programs, diplomatic pressure, and foundation networks (Parmar, 2012).

In this process, American foundations, although seemingly independent of the state, play a crucial role in shaping a normative framework that supports globalism and liberal internationalism. Thus, digital hegemony is not solely state-centric; it relies on a multi-actor and pervasive network of influence.

Netflix, YouTube, Twitter, and similar platforms are not only entertainment and communication tools; they are also ideological carriers that circulate American lifestyles, values, and norms on a global scale (Pallaver, 2011). These digital cultural production mechanisms play a central role in the construction of US hegemony, in line with Joseph Nye's concepts of "soft power" and "smart power" (Nye, 2004).

The US model of digital hegemony is far from absolute. The increasing digital capacity of the BRICS countries, especially China, has intensified geopolitical digital competition. China's development of alternative standards in digital governance, in particular, poses a direct challenge to US hegemony. Similarly, the European Union's data protection regulations (e.g., GDPR) and demands for autonomy in digital infrastructure represent a growing quest for multilateralism in response to US-centric governance.

**Comparative Assessment: Technology, Power, and Hegemony Dynamics**

***Continuity and Breakpoints in the Construction of Hegemony by Technology***

The examples of Rome, Britain, and the US, despite emerging in different historical periods, reveal how hegemonic powers utilize technology not merely as a tool but as a system-building element. In this context, both the structural features that demonstrate continuity across the three models and the differentiated hegemonic strategies shaped by the period's conditions are noteworthy.

The common characteristic of all three hegemonic powers is their use of technology not only for military superiority but also for logistical control, establishing communication networks, and generating cultural legitimacy. The Roman Empire achieved these functions under different technical paradigms, with its engineering infrastructure and road networks; Britain, with its maritime superiority and telegraph system; and the US, with digital networks and information technologies.

At this point, the table below summarizes the comparative relationship between these three hegemonic powers and technology:

**Table 1: The Role of Technology in the Hegemony Models of Rome, Britain, and the US**

|  |  |  |  |
| --- | --- | --- | --- |
| CATEGORY |  ROMAN EMPIRE  | BRITISH EMPIRE  | UNITED STATES OF AMERICA |
| **HISTORICAL PERIOD**  | 1st century BC – 5th century AD  | 18th – 20th century late  | 20th century – present |
| **FUNDAMENTAL FUNCTION OF TECHNOLOGY**  | Physical control, transportation and infrastructure  | Production, communication and global trade  | Information control, digital governance and cultural norm production |
| **BASIC TECHNOLOGICAL ELEMENTS**  | Road networks, aqueducts, amphitheaters  | Steamships, telegraph, railway  | Internet infrastructure, big data, social media platforms |
| **LOGISTIC CAPACITY**  | Rapid mobilization of legions, connection of provinces  | Global sea routes, telegraph network  | Instant global access, speed and flexibility in communication |
| **IDEOLOGICAL LEGITIMACY**  | "Roman peace" (Pax Romana), civilization-bearing  | "Civilizing mission", modernizing influence of imperial order  | Democracy, freedom, digital lifestyle, cultural attraction |
| **TECHNOLOGICAL DISSEMINATION MODE**  | Physical dissemination (by road)  | Temporal speed (telegraph and sea transportation)  | Invisible cognitive access (digital networks and content) |
| **HEGEMONY FORM** | Physical domination from the center to the periphery | Logistics superiority and infrastructure modernization | Global digital centralization and normative governance |
| **STRUCTURAL CONTINUITIES** | Physical access, dependence on central authority | Logistics control and information management | Digital infrastructure + production of ideological hegemony |
| **BREAKING POINTS**  | Limited physical spread  | Limited communication speed over time  | Digital invisibility creating ideological dependency |

As can be seen from the table, technology functioned differently in each hegemonic model, but it exhibited consistent patterns in terms of its fundamental purposes. The same function was achieved with more effective and invisible tools in each new era. Rome's paved roads evolved into Britain's telegraph wires, which in turn evolved into the fiber cables and digital cloud systems of the United States.

All three examples of hegemons provide rich historical data demonstrating how technology organizes the structural relationship between material power, logistical capacity, and ideological legitimacy:

• In Rome, engineering infrastructure was used to establish physical control, and technological superiority was legitimized through the discourse of civilization.

• Britain globalized its logistical capacity with steam power, telegraph, and industrial systems; by establishing infrastructure in colonies, it presented sovereignty as a "modernizing mission."

• The United States, on the other hand, enabled cognitive access and data control through digital networks; it also established its hegemonic power in an invisible yet comprehensive order through digital norms and cultural content.

In this transformation process, technology not only facilitated the exercise of sovereignty but also presented that sovereignty as a legitimate, inevitable, and modern phenomenon. When considered within the context of Robert Cox's theory of hegemony, all three examples position technology as the bearer of the means of production, normative structures, and information systems (Cox, 1987). Joseph Nye's concept of "soft power" helps us understand how Britain and the United States, in particular, utilize technology as a cultural magnet in the production of ideological hegemony (Nye, 2004).

This comparative picture reveals that the concept of hegemony should encompass not only questions of "who is powerful," but also how power is exercised, maintained, and legitimized. Technology is a source of strategic power that has been both continuous and formally evolving in the construction of hegemony throughout history.

• In Rome, stone-paved roads provide physical access and military mobility.

• In Britain, steam-powered ships and the telegraph provide logistical and temporal speed.

• In the United States, digital data networks enable cognitive access, cultural dissemination, and normative governance.

Therefore, hegemony has evolved into a more complex, networked, and multilayered structure with technological advancements. Historical examples offer powerful conceptual tools for predicting future forms of hegemony. It also reveals the central role that technology plays both as an instrument of power and as an architect of hegemony.

***The Evolution of Technological Power from Rome to China***

Analysis of historical examples clearly demonstrates that technology has become not only a supporting but also a directly constitutive axis in the construction of hegemony. This constitutive role has extended beyond physical domination and economic superiority to encompass areas such as logistical control, information management, and normative governance. Rome's road networks, Britain's telegraph lines, the US's digital infrastructure, and today, China's 5G, cloud, and big data systems are examples that transformed technology into the structural cornerstone of hegemony production in their respective eras.

While Rome established logistical dominance with its roads and water systems, which carried centralized authority across the imperial geography, Britain established both an economic and cognitive order with its navy and telegraph infrastructure in the post-industrial era. Since the late 20th century, the US has constructed a multilayered, invisible, and global hegemony through the internet, data flow, and cultural platforms.

Today, these historical dynamics are being reshaped, particularly by the rise of China. China's investments in strategic areas, such as 5G, artificial intelligence, big data, and quantum computing, are not only technical advancements but also efforts to shape the digital infrastructure and norms of the future. In this context, the "Made in China 2025" and "Digital Silk Road" programs are strategic tools that reflect not only the export of digital infrastructure but also its capacity to set global norms (Jun, 2022).

This transformation has not only transformed China into a technology user but also into a standard-setting, productive, and norm-setting power (Schmalz, 2024). This position transforms China's challenge to the US-centric digital order beyond technological superiority into a geopolitical and ideological rivalry (Asuquo-Ekpo, 2024; Vučetić, 2022).

The digital competition between the US and China presents a profound divergence not only in hardware and infrastructure, but also in how these technologies are governed and represented. While the US focuses on establishing global norms through open and democratic digital platforms, China is developing a more centralized, closed, and state-led digital order (Razzaq, 2024).

This divergence manifests itself not only in technology policies, as in the case of Huawei, but also in cultural, ethical, and normative differences (Kang & Im, 2021). This "tech war" in US-China relations is triggering phenomena such as mutual sanctions, subsidy competition, and technological decoupling in areas such as semiconductors (Bradford, 2023).

These developments raise a new debate within the context of classical Hegemonic Stability Theory. Instead of the production of public goods (such as security, open markets, and liquidity) envisioned by Kindleberger for hegemonic leadership, China's digital infrastructures—for example, Huawei's 5G network or the Beidou navigation system—appear to be controlled public goods that create strategic dependencies. This demonstrates that hegemonic order is not solely related to infrastructural production, but to the openness, accessibility, and normative legitimacy of this production.

China's rise presents a paradoxical picture, particularly for developing countries in South and Southeast Asia. These countries, on the one hand, strive to attract technological investments, while, on the other hand, they seek to maintain their sovereignty and digital independence (Razzaq, 2024). China's initiatives, such as the Belt and Road, are creating an alternative geopolitical and economic platform to US influence in the Middle East and Africa (Sarieddine, 2023).

However, despite China's growing technological capacity, its ability to establish a new regional hegemony remains limited. Key reasons for this include the continued US leadership in global supply chains, the existence of deep-rooted alliance networks, and a lack of trust in China (Vučetić, 2022; Bradford, 2023).

The dynamics of future digital hegemony will not be limited to infrastructure struggles; they will also intensify in cognitive and normative areas such as data management, algorithmic transparency, AI ethics, and digital citizenship. This new form of hegemony produces a power structure that is less visible but more pervasive, less physical but more mental and ethical (Allan, Vucetic & Hopf, 2018). Hegemony must now be based not only on economic and military capacity, but also on the capacity for normative persuasion and value production.

The roads of Rome, Britain's sea lanes, and the US internet reveal the strategic role technology plays in the construction of hegemony. China's digital strategies offer a paradigm that sustains but also differentiates this line. This transformation has become a struggle for hegemony waged not only on technological but also on political, ethical, and cultural levels.

Whether China's model gains universal acceptance will depend not only on its technological capacity but also on its projection of universal value production, openness, legitimacy, and soft power (Nye, 2004). Thus, technological hegemony becomes the building block of a new global order, informed by the structural examples of the past but written with the normative, cognitive, and digital codes of the future.

**Conclusion**

Throughout history, technology has been not only a supporting tool but also a direct constituent element in the construction of hegemonic orders. The examples of Rome, Britain, and the United States concretely demonstrate how hegemonic power was integrated into infrastructure, information systems, and communication in different eras.

The Roman Empire developed an infrastructure model that extended physical dominance from the center to the periphery through roads, aqueducts, and military logistics systems. This model enabled not only the movement of armies but also the exercise of political control, economic integration, and cultural dissemination. Rome's engineering marvels served as tools that embodied the empire's ideological continuity.

Following the Industrial Revolution, the British Empire expanded its hegemonic presence by establishing a global logistics and communications network through telegraph lines, railways, and naval power. This enabled it to centralize not only the flow of resources but also the flow of information and cultural influences. The order established by Britain produced continuity on both the material and cognitive levels.

Since the late 20th century, the United States has constructed a multilayered form of hegemony through digital infrastructures, internet protocols, platform economies, and algorithmic governance mechanisms. The US's institutional control over digital platforms, communication standards, and information architectures has evolved into a normative power that transcends physical sovereignty. This highlights the cultural, cognitive, and network-based aspects of hegemony construction in the modern era.

These historical examples demonstrate that hegemonic power is perpetuated not only through coercive means but also through infrastructure arrangements, information systems, and normative production. Just as Rome's roads facilitated military and administrative control, Britain's telegraph networks accelerated intra-imperial coordination, and the US's digital infrastructures enabled the centralization of global information systems.

This historical trajectory is entering a new phase today, particularly with the rise of China. China's Digital Silk Road, 5G infrastructure, and investments in artificial intelligence are not only technological breakthroughs but also expressions of its will to establish an alternative global order. However, unlike its historical predecessors, the model offered by China is more centralized, closed, and based on strategic dependencies. This transforms the struggle for hegemony in the digital age into a multifaceted struggle based not only on infrastructural competition but also on legitimacy, normative acceptance, and ethical frameworks.

Ultimately, the continuity between historical hegemony models demonstrates that technology has always been central to the production of power. The line stretching from Rome to Britain, from Britain to the United States, has produced patterns in which technological infrastructure is intertwined with hegemony. China's rise offers both a continuation and a rupture in these patterns. Therefore, the hegemonic order of the digital age will be determined not only by economic and military capacity, but also by who produces the technology, how it is utilized, and the values it conveys.

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