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OMNISCALER AND NEW TECHNOLOGICAL RACES: DIGITAL INEQUALITY IN THE CONTEXT OF TRANSFORMING GLOBAL COMPETITION

The purpose of the study is to identify the role of omniscalers in new technological races and to explain how their ability to scale infrastructural, financial, innovation, and data advantages across multiple arenas generates new mechanisms of digital inequality under the transformation of global rivalry. The article argues that contemporary competition is shifting from rivalry over individual markets toward control over scaling infrastructures that enable data processing, computing capacity, digital integration, and the diffusion of new business models. In this context, omniscalers emerge as a new type of corporate actor capable of transferring accumulated advantages across several arenas of competition simultaneously. The study combines approaches to digital development, technological races, arenas of competition, the AI foundation, and digital inequality, and relies on structural-logical analysis, comparative method, systematization, and theoretical generalization. It distinguishes between technological competition, technological rivalry, and technological races, showing that digital inequality evolves from asymmetry in access to knowledge, infrastructure, and digital markets to inequality in control over critical technological nodes and, ultimately, to inequality in the ability to scale advantages across several high-dynamics arenas.

The article demonstrates that arenas of competition function as interconnected structural nodes of the contemporary economy, while the AI foundation - combining semiconductors, cloud services, and AI software and services - serves as the core platform of current technological races. Omniscalers are conceptualized as actors that scale not a single product, but an infrastructural capability reusable across multiple technological and market environments, thereby generating cumulative self-reinforcing effects. The study proves that digital inequality increasingly concerns access to scaling infrastructures rather than only formal access to technologies, and that it manifests itself at the micro-, meso-, and macro-levels as asymmetry between firms, sectors, countries, and regions. The scientific novelty lies in interpreting omniscalers as structural actors of a new phase of technological races, refining the understanding of digital inequality as inequality of access, control, and scaling, and advancing the proposition that arenas of competition are key structural nodes of contemporary global transformations.

Keywords: *omniscalers, technological races, digital inequality, global rivalry, arenas of competition, infrastructure, artificial intelligence, competitive advantages, digital advantages, digital transformation, digital economy, transformation, asymmetry, economic power, technology, innovation, integration, R&D*

JEL classification: *D33, D72, E25, E65, O15.*

ОМНІСКЕЙЛЕРИ І НОВІ ТЕХНОЛОГІЧНІ ПЕРЕГОНИ: ЦИФРОВА НЕРІВНІСТЬ В УМОВАХ ТРАНСФОРМАЦІЇ ГЛОБАЛЬНОГО СУПЕРНИЦТВА

Мета дослідження полягає у визначенні ролі омніскейлерів у нових технологічних перегонах та з'ясуванні того, яким чином їхня здатність до міжгаленного масштабування інфраструктурних, фінансових, інноваційних і даніевих переваг формує нові механізми цифрової нерівності в умовах трансформації глобального суперництва. У статті обґрунтовано, що сучасне глобальне суперництво зміщується від боротьби за окремі ринки до

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боротьби за контроль над інфраструктурами масштабування, які забезпечують обробку даних, обчислювальні потужності, інтеграцію цифрових рішень і поширення нових бізнес-моделей. Доведено, що в цих умовах ключового значення набуває новий тип корпоративних акторів - омніскейлери, здатні переносити накопичені переваги між кількома аренами конкуренції одночасно. У результаті дослідження запропоновано розмежування трьох форм еволюції сучасної технологічної взаємодії: технологічної конкуренції, технологічного суперництва і технологічних перегонів. Показано, що цифрова нерівність змінює свої форми відповідно до зміни логіки глобального суперництва - від нерівності доступу до знань, інфраструктури та цифрових ринків до нерівності контролю над критичними технологічними вузлами, а згодом - до нерівності у здатності масштабувати переваги між кількома високодинамічними сферами одночасно.

Встановлено, що арени конкуренції доцільно розглядати як взаємопов'язані структурні вузли сучасної економіки, у межах яких концентруються інвестиції, інновації, ринкова влада та можливості масштабування. Обґрунтовано, що інфраструктурна основа штучного інтелекту, яка об'єднує напівпровідники, хмарні сервіси та програмне забезпечення і сервіси штучного інтелекту, формує базову платформу сучасних технологічних перегонів. Цифрова нерівність у сучасній економіці дедалі менше зводиться до формального доступу до технологій і дедалі більше визначається доступом до інфраструктур масштабування, вона має мікро-, мезо- і макрорівневий характер та проявляється як асиметрія між компаніями, секторами, країнами і регіонами. Наукова новизна одержаних результатів полягає у запропонованій інтерпретації омніскейлерів як структурних акторів нової фази технологічних перегонів, економічна сила яких базується на міжаренному масштабуванні інфраструктурних переваг.

Ключові слова: *омніскейлери, технологічні перегони, цифрова нерівність, глобальне суперництво, арени конкуренції, інфраструктура, ШІ, конкурентні переваги, цифрові переваги, цифрова трансформація, цифрова економіка, трансформація, асиметрія, економічна влада, технології, інновації, інтеграція, R&D*

Problem statement. The contemporary global economy is entering a phase in which technological leadership is determined less by advantages in individual sectors and increasingly by the ability to control the infrastructures that enable innovation scaling, data processing, computing capacity, and the rapid diffusion of new business models. In this context, global rivalry is shifting from competition for markets in the traditional sectoral sense toward competition for control over the institutional, technological, and infrastructural conditions under which future economic value will be created [1-3]. Within this configuration, a new type of corporate actor becomes especially significant: omniscalers, which concentrate the financial, technological, organizational, and infrastructural resources necessary to deploy competitive advantages across multiple arenas of competition simultaneously.

The emergence of omniscalers reflects a deeper transformation than the simple expansion of large digital corporations or another wave of platform capitalism. It signals a structural reconfiguration of the logic of market power accumulation. Whereas in earlier decades dominance was secured through control over production, logistics, financial flows, or isolated technological competencies, under current conditions it increasingly depends on the ability to combine and transfer multiple types of advantages simultaneously. Control over computing infrastructure, semiconductors, cloud environments, data, artificial intelligence models, and large-scale R&D investment together form a new type of cross-sector infrastructural power. Under such conditions, new technological races cannot be reduced to competition for leadership in artificial intelligence, microelectronics, or digital services alone. Their essence lies in the struggle to define the technical, organizational, and market conditions under which other sectors will operate. Control over cloud services, semiconductors, data centres, AI tools, digital interfaces, and platform infrastructures therefore provides not only sectoral advantage, but also the ability to shape the terms of access to future growth for other market participants.

This shift is closely connected to the growing importance of arenas of competition - segments of the economy characterized by high growth, intense redistribution of market shares, rapid capital accumulation, and accelerated technological renewal. These arenas are becoming the spaces in which new centres of economic power emerge and from which adjacent sectors, investment patterns, innovation trajectories, and regional configurations of leadership are increasingly restructured. The relevance of this study lies in the fact that contemporary literature still lacks a coherent explanation of how this new type of corporate actor, capable of scaling advantages across multiple arenas, reshapes the architecture of global rivalry and deepens digital inequality. The analysis of omniscalers, therefore, makes it possible to reinterpret the relationship between technological races, infrastructural concentration, and new forms of global economic power.

Analysis of recent research and publications. The contemporary literature on global rivalry increasingly focuses on sectors and environments in which innovation, investment, market power, and scaling potential are concentrated. In particular, C. Bradley, M. Chui, K. Russell, K. Ellingrud, M. Birshan and S. Chettih, as well as K. Russell, C. Bradley, N. Sastry, S. Chettih, K. Ellingrud and N. Goryunova, show that new arenas of competition are becoming focal points of future growth and structural nodes of the redistribution of economic power [1-3]. At the same time, the authors' previous studies [4-7] demonstrate that the development of such arenas is accompanied not only by accelerated innovation, but also by new forms of socio-economic stratification, spatial polarization, and uneven distribution of digital benefits.

The theoretical foundation for understanding digital inequality as a component of broader global asymmetries is developed in the works of O. Ivashchenko and

N. Reznikova, who analyse economic development, the emergence of new growth centres, and the transformation of dependency structures in the global economy [8-9]. This line of inquiry is further specified in the studies of N. Reznikova, O. Bulatova, and O. Ivashchenko, where attention is given to competitive dynamics in digitalized markets, the risks of information-digital neo-protectionism, the distinction between the digital divide and digital inequality, and the role of innovation as a driver of digital transformation in the global economy [10-12]. Closely related to this perspective are the findings of D. Rusak, N. Reznikova, and O. Ivashchenko, who show that under conditions of global instability, digitalization affects not only markets and consumption but also the resilience of supply chains, risk management models, and the architecture of international economic interaction [13].

An important conceptual basis for clarifying the nature of digital transformation is provided by S. Brennen and D. Kreiss, who distinguish digitization from digitalization and thereby interpret digital development as a structural transformation of the economy and society [14]. In applied terms, this approach is developed in the works of O. Desyatnyuk, A. Krysovatyy, O. Ptashchenko, O. Kyrylenko and O. Kurtsev, as well as T. Elkjaer and J. Damgaard, A. Hanelt, E. Piccinini, R. W. Gregory, B. Hildebrandt and L. M. Kolbe, and J. L. Johns, who examine digital strategies in logistics, transformations in the global network of foreign direct investment, the digital transformation of physical industries, and technological upgrading within global value chains [15-18]. These studies demonstrate that digital development alters not only the tools of economic activity but also the principles of value distribution, production coordination, and control over critical infrastructures.

A separate strand of the literature, represented by T. Koch and J. Windsperger, shows that competitive advantages in the digital economy are increasingly determined not by individual products or sectors, but by positions within networks and by control over platforms, data, and interaction infrastructures [19]. Within this framework, digital inequality is linked not only to access to technologies but also to the ability to integrate into new models of value creation. This perspective is further developed in the works of N. Reznikova, O. Bulatova, O. Chugayev, O. Ptashchenko, O. Ivashchenko, V. Karp, M. Grod and S. Stakhurska, who address intergenerational asymmetries, new models of ownership and consumption, value transformation, and the interconnection between the digital and green economy [20-23]. Further expansion of the analytical framework is provided by A. Rip, J. H. Shen, S. Tang and K. Deng, as well as A. Shlapak, O. Yatsenko, O. Ivashchenko, N. Zarytska and V. Osadchuk, and J. Wei, X. Zhang and T. Tamamine, who analyse the socio-economic context of technological adoption, changes in value distribution along global value chains, the digital transformation of international trade, and spillover effects of digitalization within production networks [24-27].

Despite the growing body of research on digital transformation, platform economy, global technological competition, and the infrastructural foundations of innovation, contemporary academic literature still lacks a comprehensive explanation of how a new type of corporate actor - omniscalers - reshapes the architecture of global rivalry. Existing studies tend to focus either on individual digital platforms or on specific technological domains such as artificial intelligence, semiconductors, and cloud services as relatively independent segments. Such an approach does not fully capture the mechanisms of cross-arena transfer of infrastructural, financial, innovation, and regulatory advantages that become decisive in new technological races.

It should be emphasized that the emergence of omniscalers reflects not only the concentration of economic power within sectors but also a deeper transformation in the logic of market power formation, where competitive advantage arises at the intersection of multiple arenas of competition. This creates the need for a theoretical understanding of omniscalers as carriers of cross-sector infrastructural advantage, capable of determining the pace, scale, and direction of contemporary technological races, while simultaneously intensifying digital inequality across countries, regions, firms, and technological ecosystems.

The purpose of the article is to determine the role of omniscalers in new technological races and to examine how their cross-arena scaling of infrastructural, financial, and technological advantages generates new mechanisms of digital inequality in the context of the transformation of global rivalry.

Research methods. To achieve the goal, the study used a complex of general scientific and special methods of economic analysis. The method of structural-logical analysis was used to reveal the relationship between digital development, new technological races, competition arenas, the infrastructure basis of artificial intelligence, and digital inequality. The comparative method was used to distinguish technological competition, technological rivalry, and technological race, and to compare different manifestations of digital inequality in the context of the transformation of global rivalry. The systemic approach allowed us to consider digital inequality as a multi-level phenomenon, covering micro-, meso-, and macro-levels and manifesting itself as asymmetry between companies, sectors, countries, and regions. The method of systematization is used to organize scientific approaches to the interpretation of omniscalers, digital inequality, competitive arenas, and the infrastructure foundation of artificial intelligence as key elements of modern economic transformation. Theoretical generalization is used to draw conclusions about the role of omniscalers in the new technological race and to define digital inequality as the inequality of access, control, and the scaling of benefits.

Main results of the research. To achieve the stated objective, we distinguish three evolutionary forms of contemporary technological interaction that reflect the progressive complication of global economic rivalry: technological competition, technological rivalry, and technological races. This distinction not only allows us to identify the place of omniscalers within the contemporary economic architecture but also to trace how the forms of innovation and digital inequality change as global rivalry evolves. Technological competition should be understood as the basic

form of market interaction, in which economic actors compete to create, commercialize, and diffuse new technological solutions. At this stage, decisive importance belongs to innovation activity, research capacity, speed of market entry, and the ability to integrate new technologies into production, management, and consumption processes. Under such conditions, inequality is primarily resource- and innovation-based, manifesting itself as asymmetry in access to knowledge, research infrastructure, human capital, entrepreneurial ecosystems, and digital markets.

Technological rivalry represents a higher level of strategic technological interaction, in which technologies cease to be merely a source of market advantage and become instruments of structural influence and long-term economic power. At this stage, the key issue is no longer only the ability to create new technologies, but the capacity to control critical technological competencies, production nodes, standards, patent regimes, supply channels, and institutional conditions of access to high-technology sectors. The digital dimension thus becomes an object of strategic control, including cloud services, data centres, semiconductor capacity, data transmission channels, computing architectures, digital interaction platforms, and regulatory regimes of access to digital markets. As a result, inequality shifts from access to the ability to determine the conditions under which others gain access to critical technological infrastructure.

Technological races constitute the most intensive and systemic form of contemporary technological interaction. At this stage, decisive importance lies not merely in the creation or control of technologies, but in the ability to rapidly scale accumulated advantages across several high-dynamics arenas simultaneously. Innovation here is no longer a discrete event but a continuous cycle of generating, scaling, and commercializing new capabilities across several arenas at once. The digital dimension ceases to be only a medium or object of control and becomes the infrastructural basis for reproducing advantage. It includes control over computing power, large-scale data, artificial intelligence models, cloud infrastructure, semiconductor access, and the energy base of digital systems. It is precisely within this logic that omniscalers emerge as a new type of corporate actor capable of transferring financial, technological, and infrastructural advantages across multiple arenas simultaneously.

This approach suggests that digital inequality is neither homogeneous nor static. It evolves alongside the global technological environment. At the stage of technological competition, it appears as inequality in access to innovation resources and digital opportunities. At the stage of technological rivalry, it becomes a matter of inequality in control over critical technological infrastructure. At the stage of technological races, it takes its deepest form as inequality in the ability to scale advantages across multiple arenas. This latter form is the most relevant for explaining the contemporary architecture of global rivalry, since it reflects not only the distribution of access to technologies, but also the capacity to determine the pace, scale, and direction of technological transformation. In this sense, omniscalers are not merely participants in new technological races, but their key structural beneficiaries. They concentrate the resources required to transform local technological advantage into a long-term, infrastructurally reproducible form of market power. Their expansion is therefore not only a consequence of the digital transformation of the global economy, but also one of the principal mechanisms through which contemporary digital inequality deepens.

This distinction between stages of technological interaction enables analysis of the structural environments in which contemporary innovation scaling and new economic power are formed. These are arenas of competition that should be understood not simply as high-growth sectors but as interconnected infrastructural nodes of the global economy. It is within these arenas that investment concentration, accelerated innovation cycles, redistribution of market shares, and the emergence of new centres of value take place [1; 3]. Arenas of competition combine two key characteristics: high growth rates and highly competitive dynamism. They therefore not only expand rapidly but also remain open to redistribution of positions among actors. Such a configuration creates a favourable environment for the emergence of new leaders, while simultaneously requiring large-scale investment, innovation intensity, and rapid scaling capacity. As a result, these arenas become the core of contemporary economic transformation, shaping the development of adjacent industries and the new logic of global growth [1].

This analytical framework further demonstrates that arenas of competition do not function in isolation but form an interconnected system in which some technological segments create the conditions for the development of others. This systemic character is especially visible in the AI foundation, which combines semiconductors, cloud services, and AI software and services. Together, these technologies form the core platform upon which further innovation unfolds across digitization, robotics, autonomous transport, defence systems, and biotechnology [3]. The infrastructural nature of this foundation means that control over it creates influence not only within one sector but across a much wider range of economic activity. Under contemporary conditions, computing power, access to data, energy provision for digital systems, and the capacity to integrate them into a unified architecture become critical resources without which innovation scaling is impossible. This is why new technological races increasingly take the form of competition for infrastructure rather than for isolated technological solutions [2; 3].

Within this infrastructural-investment logic, a new type of corporate actor emerges - omniscalers. Their rise is associated with the accumulation of financial, technological, and organizational resources sufficient to operate across several arenas of competition simultaneously and to transfer advantages between them. Unlike traditional multinational corporations or digital platforms, omniscalers do not merely scale a particular product or market. They scale infrastructural capacity that can be deployed across multiple spheres of economic activity. Their power, therefore, derives not simply from the volume of assets or market share but from the ability to repeatedly use infrastructure, data, algorithms, computing capacity, and engineering

capabilities across different arenas. As a result, each new investment or technological solution not only generates additional revenue but also reinforces the company's position in other segments. This cumulative logic produces a self-reinforcing effect that is fundamentally unattainable for actors confined to a single industry [2; 3].

Omniscalers are therefore a product of a new phase of technological races. What is changing is not only the speed of innovation, but the very object of competition. In previous technological waves, firms competed primarily for the commercialization of new products or for leadership within individual industries. Under current conditions, however, the main object of competition is the infrastructural foundation of innovation itself. This means that competition is increasingly centred on data centres, energy provision for computing capacity, graphic processors, artificial intelligence models, cloud architectures, access to semiconductor manufacturing, control over supply chains of critical components, and the ability to integrate these assets into resilient business ecosystems.

In this sense, new technological races are simultaneously a regrouping of global economic power. They not only reshape the distribution of profits across sectors but also create a new configuration of global inequality. Digital inequality cannot be reduced to unequal access to the internet, digital skills, or isolated technological services. It is increasingly tied to unequal access to the foundational infrastructures of the digital economy, including computing power, semiconductor resources, data centres, AI models, engineering talent, venture and corporate capital, and the markets in which technological solutions can be scaled [10-12; 19]. This is why digital inequality acquires not only a technological but also a geoeconomic meaning. It reflects an asymmetrical distribution of the capacity to scale. Countries, regions, and firms that control critical infrastructural nodes of the new economy gain disproportionately greater opportunities to generate innovation, accumulate capital, and consolidate long-term competitive advantages. By contrast, those remaining outside these infrastructural systems are increasingly placed in positions of structural dependence. They may participate in the digital economy as users, markets, or suppliers of selected inputs, but not as its architects or as carriers of systemic market power [11; 20; 22].

This configuration becomes especially visible under the transformation of global rivalry, which is increasingly defined not only by trade and investment flows, but by competition for technological sovereignty, industrial autonomy, and strategic control over the infrastructures of the future. In this context, struggles over semiconductors, artificial intelligence, digital platforms, cloud services, biotechnology, and critical supply chains cease to be purely market-based. They increasingly take the form of geoeconomic rivalry in which corporate strategies, state support, export controls, industrial policy, and security considerations are fused into a single system of decision-making.

Omniscalers occupy a special position in this system because they are the actors most adapted to this new logic of rivalry. What distinguishes omniscalers is their capacity to operate across commercial, technological, and geopolitical logics at the same time, a combination that makes financial scale secondary to positional advantage. This is what places them at the centre of the current transformation. They do not merely respond to new technological races; they increasingly shape their pace, scale, and configuration [3; 19]. The further development of the omniscaler concept requires viewing them not merely as corporate actors, but as functional elements of a new industrial architecture. This is an economic configuration in which the interconnections between arenas of competition become decisive for value creation, and in which separate technological segments can no longer be understood in isolation. Within such a system, omniscalers function as integrators, connecting different arenas through infrastructural, financial, and technological channels.

This integrative role is most clearly expressed in their ability to form cross-arena value chains. Whereas global value chains were historically fragmented by stages and geography, the new economy is increasingly organized around functional blocks that can be deployed across multiple industries simultaneously. Computing infrastructure developed for artificial intelligence, for example, is not confined to digital services but is also applied in biotechnology, defence technologies, autonomous transport, financial services, and industrial production. As a result, value chains become multidimensional, while their key nodes emerge as universal sites of advantage generation. In this context, the AI foundation assumes particular importance as the central element of contemporary technological races. Its components - semiconductors, cloud services, and AI software and services - form the core around which a new economic ecosystem is being built. Control over these components means control over the basic conditions for creating and scaling innovation. This is why omniscalers seek to secure positions across each of these segments, building vertically and horizontally integrated systems [2; 3].

Such integration is not neutral from the standpoint of competition. It strengthens market power through asset complementarity. Investments in semiconductors strengthen capabilities in cloud services, while cloud platforms, in turn, secure access to the data needed to train AI models. This generates a cumulative effect in which each new infrastructural element reinforces the others. Such interdependence raises barriers to entry for new participants and consolidates the positions of firms that have already reached a critical scale. It is here that one of the defining features of omniscalers becomes most visible: the ability to reuse infrastructure. Their infrastructures are not tied to a single product or market, but function as universal bases for launching new directions of activity. This significantly lowers the marginal costs of entry into new arenas while increasing the potential returns. As a result, omniscalers gain a systemic advantage in the speed of expansion and scaling. This process is directly connected to a new logic of investment races. Investment logic has shifted. Where firms once allocated capital to expand capacity or cut costs, they now direct it toward infrastructures whose value lies in being reusable across sectors, a fundamentally different calculus. This is reflected in the sharp increase in capital

expenditure on data centres, computing capacity, AI research, advanced chip development, and the vertical integration of technological chains.

The consequence is a new type of investment asymmetry. Firms that already possess substantial financial resources and infrastructure access can undertake investments on a scale unattainable for most other actors. This leads to a concentration of innovation potential within a narrow group of firms, widening the divide between leaders and the periphery of the global economy. That divide constitutes one of the central dimensions of contemporary digital inequality. In this context, digital inequality acquires a multi-level character. The inequality operates across levels. Individual firms diverge in their access to data and engineering talent; sectors diverge in the concentration of investment they attract; and at the national level, the gap between economies that anchor the AI foundation and those that sit at its margins widens with each investment cycle. These are not separate phenomena: movement at one level reshapes conditions at the others [8-12].

Of particular importance is the geographic concentration of omniscalers. The dominance of companies based in the United States and Greater China means that these economies capture the bulk of the gains from new technological races. They control a substantial share of the infrastructure underpinning the digital economy, shape standards, influence innovation, and absorb the largest financial flows. Other regions, including Europe and most developing economies, are increasingly placed in more dependent positions, which reinforces global asymmetry. This asymmetry has not only an economic but also a political dimension. Control over technological infrastructure becomes an instrument of geoeconomic influence. States that host or support omniscalers gain the capacity to use them as levers of influence in international relations. This is reflected in export control policies, restrictions on access to technologies, standard-setting processes, and industrial policy measures that support national firms. In this way, omniscalers emerge not only as economic but also as geopolitical actors. In this context, the transformation of global rivalry can be understood as a shift toward a model in which economic and political power become increasingly intertwined. Technological races become a form of strategic competition in which decisive importance lies not only in the ability to innovate but also in controlling the conditions under which innovation diffuses. The new architecture of the global economy is therefore being formed at the intersection of market and political processes. Within this architecture, omniscalers function as key nodes through which the main flows of value, information, and innovation pass. They influence which technologies receive funding, which business models become dominant, which standards are established, and which markets are opened or restricted. Their role lies not only in creating new products but also in shaping the rules that govern the global economy.

Conclusion. The argument advanced in this article rests on a single core claim: omniscalers are not simply large digital firms that have grown across sectors. They represent a structurally distinct type of actor whose competitive strength derives from the capacity to transfer infrastructural advantages across multiple arenas simultaneously, generating cumulative effects that are architecturally unavailable to firms confined within a single industry. Recognizing this distinction matters because it changes what questions are worth asking about technological competition, digital inequality, and the distribution of economic power.

The three-stage framework (technological competition, rivalry, and races) was developed precisely to make that distinction analytically tractable. At the stage of technological competition, inequality is essentially a resource problem, addressable through investment in education, R&D, and connectivity. At the stage of technological rivalry, it becomes a governance problem, centred on who controls standards, supply chains, and access conditions. At the stage of technological races, it transforms into something harder to name and harder to address: a structural asymmetry in the capacity to scale. Countries and firms outside the AI foundation (semiconductors, cloud infrastructure, AI software ecosystems) are not simply behind on a common trajectory. They operate under different structural conditions, in which the investments needed to close the gap are being pulled in the opposite direction by the logic of omniscaler expansion.

This is the contribution the article makes to the existing literature. Prior work on digital inequality has tended to treat it as a multidimensional but ultimately measurable gap. The present analysis suggests it is better understood as a positional problem, defined less by what actors lack than by where they stand in relation to the infrastructural nodes through which scaling capacity is organized.

Future research should map which arenas of competition are most tightly coupled to the AI foundation, how transfer mechanisms between arenas actually operate at the firm level, and whether any peripheral economies have found viable entry points into the infrastructural layer of global competition.

The scientific novelty of the present study lies in three interconnected contributions: the conceptualization of omniscalers as structural actors of a new phase of technological races rather than an extension of existing platform typologies; the reconceptualization of digital inequality as a progression from access asymmetry through control asymmetry to scaling asymmetry, with the third form being the most consequential under current conditions; and the reinterpretation of arenas of competition as infrastructurally coupled nodes of a single economic architecture rather than independent high-growth sectors. Together, these propositions offer a framework for analysing a form of global economic power that existing theories of market dominance, digital development, and technological rivalry have not yet adequately described.

Declaration on the use of AI tools. During the preparation of this article, the authors used Grammarly for Windows (Grammarly Inc.) solely for grammar correction, stylistic refinement, and language editing. The tool was not used to generate scientific content, formulate arguments, analyse sources, interpret findings, or draft the conclusions. Authors are fully responsible for the accuracy, reliability, and integrity of the presented scientific data.

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