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STRUCTURAL DYNAMICS OF DIGITAL INEQUALITY IN THE GLOBAL ECONOMY

The expansion of digital technologies constitutes a fundamental transformation of contemporary economic and social systems. However, the diffusion of digital tools and infrastructures does not generate uniform developmental outcomes. Instead, digital transformation interacts with existing institutional arrangements and social hierarchies, producing differentiated trajectories of inclusion and exclusion [1]. Digital inequality should therefore be understood as a structurally conditioned phenomenon embedded in the organization of the digital economy rather than as a transitional imbalance associated with uneven technological diffusion.

Conventional approaches that conceptualize digital inequality primarily in terms of access or skill differentials are analytically insufficient. While such approaches identify important empirical disparities, they do not account for the persistence of unequal outcomes in contexts where access is formally expanded. A stratification-oriented perspective allows digital inequality to be interpreted as the outcome of a hierarchical allocation of positions within the digital system. These positions determine not only exposure to digital technologies but also the capacity to utilize them effectively and to benefit from their economic and social returns.

Digital stratification refers to the institutionalized ordering of actors according to their control over digital resources, infrastructures, and governance mechanisms. This ordering is not accidental but reflects historically formed distributions of power, capital, and knowledge. Digital technologies are incorporated into these structures, modifying their operational logic while preserving their hierarchical nature. As a result, digital inequality is reproduced through mechanisms that translate structural positions into differentiated capabilities and outcomes.

One of the central mechanisms shaping digital inequality is the institutional regulation of digital infrastructures. Differences in connectivity quality, affordability, and reliability create uneven

conditions for participation in digital environments. These infrastructural inequalities have cascading effects, influencing educational opportunities, labor market participation, and access to public and private services. In this way, infrastructural positioning becomes a foundational determinant of long-term capability formation.

A second mechanism operates through the socially differentiated acquisition and application of digital competencies. Digital skills are developed within specific educational, professional, and cultural contexts that vary significantly across social groups. Equal formal access to technology does not imply equal capacity to transform digital tools into productive outcomes. The ability to convert digital resources into economic, social, or cultural advantages depends on complementary institutional supports and prior capital accumulation [2]. Economic returns from digitalization are further shaped by the concentration of ownership and control over key digital assets. This concentration reinforces existing inequalities and generates new forms of structural advantage.

Labor markets represent a critical arena in which digital inequality is reproduced. Digitally mediated forms of employment are characterized by increasing segmentation, with high-skilled, well-protected positions coexisting alongside precarious, poorly regulated forms of work. Algorithmic management systems contribute to this segmentation by standardizing evaluation, allocating tasks, and distributing risks in ways that disadvantage structurally weaker participants. These labor dynamics have cumulative effects on income stability, skill development, and social security.

The spatial dimension of digital inequality reflects the uneven integration of territories into the global digital economy. Centers of technological innovation, investment, and regulatory influence are geographically concentrated, while peripheral regions often remain dependent on externally controlled platforms and infrastructures. This spatial hierarchy limits the capacity of less advantaged regions to shape their own digital development paths and to retain the value generated through digital activities.

Intergenerational processes further entrench digital inequality [3; 4]. Differential access to education, digital resources, and stable economic conditions shapes the initial capability sets of younger cohorts. These differences accumulate over time, transforming temporary disadvantages into persistent structural inequalities. Digital inequality thus becomes

embedded in long-term social reproduction processes rather than remaining a short-term policy challenge.

The interaction of these mechanisms produces stable configurations of opportunity and constraint. Some groups experience cumulative disadvantage, in which disadvantages in infrastructure, skills, and labor-market positioning reinforce one another across multiple domains of life. Other groups benefit from cumulative capability expansion, where favorable institutional conditions enable sustained access to high-quality opportunities. A distinct configuration emerges when concentrated control over digital systems allows certain actors to institutionalize their advantages by shaping governance frameworks and market conditions.

Policy responses to digital inequality must therefore be grounded in an understanding of its structural foundations. Interventions limited to access provision or basic training are unlikely to disrupt entrenched hierarchies. Effective strategies require coordinated institutional reforms that address ownership structures, labor regulation, educational systems, and digital governance. Such reforms must recognize the multidimensional and cumulative nature of inequality reproduction.

Reducing cumulative constraints requires integrated policies that simultaneously target infrastructure quality, skill formation, employment security, and social protection. Expanding access to cumulative capability pathways involves ensuring equitable entry into high-quality education and stable digital employment. Addressing structurally generated privilege necessitates regulatory frameworks that limit excessive concentration, enhance transparency of digital governance, and support alternative organizational models.

Within the broader context of global development strategies, digital inequality increasingly intersects with other structural transformation agendas, particularly those associated with sustainability and technological globalization. The digital transformation of economies unfolds simultaneously with environmental and green transitions, and their interaction is neither automatic nor socially neutral [5]. Digital technologies may support resource efficiency, innovation diffusion, and sustainable production, yet unequal access to digital infrastructures, competencies, and decision-making arenas conditions who is able to participate in and benefit from these processes. As a result, digital inequality functions as a mediating structure that shapes the distributional outcomes of both digital and green transitions [6]. In conditions of technoglobalism, where technological change is embedded in global production, trade, and governance regimes, disparities in digital

capabilities and control reinforce asymmetric integration into international economic relations. This reinforces the need to conceptualize digital inequality not merely as a technical divide, but as a multidimensional phenomenon that shapes the capacity of economies and social groups to pursue sustainable development trajectories and capture value from interconnected global transformations.

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