

Foreword

Anastasia Panori's book *Digitally Disrupted Space: Proximity and New Development Opportunities for Regions and Cities* offers an in-depth analysis of the impact of digital transformation on our understanding of urban and regional space. The book analyzes how digital transformation affects spatial dynamics, social relationships, and organizational structures. Three key questions to be addressed are: (a) What disruptions do digital technologies introduce to the concept of space, specifically in terms of space dynamics, space connectors, and space routines? (b) How does the digital space impact the twin transition? (c) What challenges does the digital space present for regional development, particularly in terms of productivity, resilience, and inclusion?

Panori suggests a holistic approach to the design of urban and regional space that considers the interaction between physical, social, cultural, and technological aspects. Accordingly, this involves strategies that overcome various barriers and promote better communication and collaboration across different spatial dimensions.

Digitally disrupted space into the three worlds

Upon reading the first two chapters of the book and then reflecting upon it as a whole, I felt entering Penrose's three worlds, the three distinct yet interconnected realms of reality. The physical world of the tangible universe, filled with objects and phenomena observable and interactable via our senses and scientific instruments; the mental world of consciousness, subjective experiences, and human cognition; and the platonic world, filled with forms, mathematics, and scientific concepts that exist independently of human minds or the physical universe. While digital space can be interpreted as existing across all three worlds—hardware devices in the physical world, experiences of interacting with digital space in the mental world, and algorithms, data structures, and mathematical models in the platonic world—it tends to lean heavily toward the mental and conceptual worlds. The physical world, despite being crucial as the digital space's foundation, is somewhat less "visible," directly interacting less with users and driving the operational models of the digital realm. *Digitally Disrupted Space* effectively conveys this sensation of exploring the world of forms, concepts, and models that underpin the digital

transformation of space from start to finish. It delves sequentially into key concepts established to explain the digital transformation of urban and regional space, collating in a single document the fundamentals of the ongoing digital transformation in cities and regions.

Space dynamics: Agglomeration, digital platforms, and platform ecosystems

Digital transformation challenges the concept of agglomeration economies and the benefits organizations gain when they are located near each other in physical space. Traditionally, within urban and regional theory, agglomeration benefits have been attributed to knowledge spillovers, shared infrastructure and services, and specialized labor market pooling. Yet, does virtual proximity erode these benefits? Do innovative companies, for instance, still require geographical clustering and location within specific regions, or can a hybrid physical-social-digital spatial setting offer greater degrees of freedom and more decentralized geographies?

Digital space dynamics has introduced new concepts in the geographical settings for innovation and value creation, particularly through digital platforms and platform-based ecosystems (Anttiroiko, 2016; Hein et al., 2020; Strüver & Bauriedl, 2022). Such ecosystems, whether referred to as digital, smart, or platform-based, consist of interconnected organizations that utilize information technology resources to interact with each other and cooperatively create new business models and capture value. Platforms are technological building blocks that offer the foundation for interdependent firms to develop interrelated products, technologies, and services (Gawer, 2010). As Panori notes, these ecosystems significantly impact geographical dispersion having disruptive effects through the promotion of collaborative intelligence, the creation of “spaceless” networks, the facilitation of remote work, digital nomads, and the rise of algorithmic work. The dynamics of agglomeration economies, the changing organizational structures and mobility patterns, are decomposed into their fundamental elements to reveal their underlying mechanisms.

Space connectors, externalities, and digital externalities

In technological change and innovation theory, and consequently, in digital transformation, externalities play a crucial role through various mechanisms such as spillovers, knowledge diffusion, open intellectual property, innovation imitation and demonstration, and untraded interdependences.

Panori expands on this line of thinking outlining “space connectors” that serve as enablers of externalities across different types of space. Using the concept of proximity as a base, she distinguishes various types of connectors, such as infrastructures within geographic proximity, management within organizational proximity, personal relations within social proximity, and research within cognitive proximity. Digital space connectors mirror existing connectors operating in different space dimensions. In turn, digital space connectors introduce externalities, thereby making the digital space a fertile environment for externalities and uncompensated benefits. Network effects also produce network externalities, which arise when the value of a product or service increases as its usage expands—a common phenomenon in the digital economy.

Hence, in the context of smart growth, digital environments, digital commons, and digital platforms play a transformative role in entrepreneurial ecosystems (Alvedalen & Boschma, 2017; Jacobides, Cennamo, & Gawer, 2018; Subramaniam, Iyer, & Venkatraman, 2019). They steer these systems toward becoming digitally connected ecosystems, contributing to the creation of digital externalities. This trend carries significant implications as it shifts the focus of growth issues from startups to business ecosystems containing organizations connected over Internet platforms by information and knowledge resources.

Space routines and multilevel perspective on system innovation

In post-Schumpeterian thinking, routines are a cornerstone of innovation. Also, in evolutionary economic geography, the behavior of firms is guided by routines and market competition, along with funding institutions, operate as routine selection mechanisms. This leads to the diffusion of “smart” or fit routines and disappearance of “stupid” or unfit routines (Boschma & Frenken, 2006).

In radical innovations, the multilevel perspective (MLP) goes deeper into system-level changes. The latter arise when the existing sociotechnical regime reveals significant problems, key innovations appear that inspire new designs, and early adoptions of transition technologies occur. Transformations are nested at three levels within the system: the landscape macrolevel, the regime mesolevel, and the niche microlevel. Geels and Schot (2007) have identified five system-level innovation pathways: (a) transformation of regimes without reliance on a single dominant technology, (b) technological substitution where a radical technology replaces an existing one, (c) dealignment and realignment of existing regimes, (d) establishment of a new sociotechnical system, and (e) regime reconfiguration when numerous technologies undergo transformation. Recently, new insights into MLP thinking have emerged from considerations of

interactions within cyber-physical systems of innovation and smart ecosystems, where digital elements are employed to interconnect routines across different vertical ecosystems within cities.

Panori adheres to this thinking and discusses both the routines' empowerment through digital space and the multilevel perspective elements when referring to digital space. She details the digital elements in product innovation routines, urban sustainability routines, and smart growth routines. Then, in transition pathways, she outlines how digital space complements the MLP on transition. Niches enable the emergence of new digital elements, regimes define the settings under which digital proximities occur, landscapes encompass digital connectors, configurations result in the emergence of digital routines, and trajectories reflect the dynamic processes taking place within digital space. In the end, there is continuity in theory building, highlighting how the digital space penetrates transition pathways by introducing a strong digital dimension to the already existing physical and institutional dimensions of system-level innovations.

Digitally Disrupted Space: Proximity and New Development Opportunities for Regions and Cities is a truly enlightening exploration into the complexities of digital transformation in urban and regional spaces. We have underlined a few elements of the multifaceted relationship between space and proximity discussed, which break new ground in our understanding of how digital technology is redefining the socio-spatial dynamics. This book is a must-read for anyone interested in how digital disruptions are reshaping agglomeration, externalities, productivity, sustainability, and inclusion, and it offers a unique perspective on the fusion of the physical, social, cultural, and technological aspects of spaces in cities and regions.

Nicos Komminos

URENIO Research, Aristotle University of Thessaloniki, Thessaloniki, Greece

References

- Alvedalen, J., & Boschma, R. (2017). A critical review of entrepreneurial ecosystems research: Towards a future research agenda. *European Planning Studies*, 25(6), 887–903.
- Anttiroiko, A. V. (2016). City-as-a-platform: Towards citizen-Centre platform governance. In *RSA winter conference*.
- Boschma, R. A., & Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography*, 6(3), 273–302.
- Gawer, A. (2010). The organization of technological platforms. In Vol. 29. *Technology and organization: Essays in honour of Joan Woodward* (pp. 287–296). Emerald Group Publishing Limited.
- Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy*, 36(3), 399–417.

- Hein, A., Schreieck, M., Riasanow, T., Setzke, D. S., Wiesche, M., Böhm, M., & Krčmar, H. (2020). Digital platform ecosystems. *Electronic Markets, 30*, 87–98.
- Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal, 39*(8), 2255–2276.
- Strüver, A., & Bauriedl, S. (2022). *Platformization of urban life: Towards a technocapitalist transformation of European cities* (p. 304). Transcript Verlag.
- Subramaniam, M., Iyer, B., & Venkatraman, V. (2019). Competing in digital ecosystems. *Business Horizons, 62*(1), 83–94.