

# Does Virtual Work Decentralize Cities? Intra-Urban Neighborhood Preferences of Software SMEs - The Case of Tallinn, Estonia

Olli I. Jakonen

<http://orcid.org/0000-0002-0726-7918>

*Department of Civil Engineering and Architecture, Tallinn University of Technology, Estonia*

Jenni Partanen

<http://orcid.org/0000-0002-7857-2346>

*Department of Built Environment, Aalto University, Finland*

**Received:** November 12th, 2025 | **Accepted:** February 11th, 2026

## ABSTRACT

Digitalization challenges spatial assumptions in urban economic theory and conventional urban planning thinking. Information and communications technologies could bridge access to qualities and resources typically associated with certain neighborhoods, transforming the roles of city centers and suburban business parks. This study examined the role of virtual/remote coordination in the neighborhood preferences of software small and medium software enterprises (SMEs). These companies rely heavily on knowledge and digital tools in flexible remote work arrangements. Analyzing a 2025 survey dataset of 94 software SMEs registered in Tallinn, Estonia, this work explored how neighborhood qualities, virtual coordination practices, and substitutability potential in company activities relate to neighborhood location preferences using ordinal logistic regression models. Despite evidence toward the substitutive capability of information and communications technologies, for the majority of software SMEs, virtual work and advanced organizational digital capabilities do not remove the appeal of central neighborhoods, and physical access to at least some localized characteristics remains important.

## KEYWORDS

Software Industry, Digital Economy, Industry Location, Neighborhood Preferences, Digital Substitution

## INTRODUCTION

Information and communications technologies (ICTs) may virtually substitute face-to-face (F2F) interactions and decouple functions from physical spaces, leading to debate on their decentralizing potential (Dadashpoor & Yousefi, 2018; Tranos & Ioannides, 2021; Tranos & Nijkamp, 2013). This inevitably challenges not only the spatial assumptions in economic theory but also the assumptions and conventional thinking that urban planning is based on. Basing planning on outdated assumptions about the drivers of industrial co-location makes predictive urban economic planning difficult and leads to irrelevance. Therefore, an established concern has been how digitalization should be integrated with existing, location-based theories of spatial economies (Moriset & Malecki, 2009; Tranos & Ioannides, 2021; Tranos & Nijkamp, 2013, 2014). In this debate, one key focus has been on industrial location patterns and how their underlying mechanisms are transformed.

DOI: 10.4018/IJEPR.404751

This article published as an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and production in any medium, provided the author of the original work and original publication source are properly credited.

These spatial changes ultimately occur within the framework of the digital economy. While built on physical telecommunication infrastructures (Malecki, 2017), it relies heavily on the internet and comprises the transactions, exchanges, and production of digital goods and services, the digital coordination of the delivery of tangible goods, and the functions that support these activities (Atkinson & McKay, 2007). In a digitalizing free-market economy, these activities represent an increasingly important share of all economic activity (Khilukha, 2024; Malecki & Moriset, 2007).

The digital economy depends on software (Bukht & Heeks, 2017; Kitchin & Dodge, 2011, p. 250). Software “produces new ways of doing things, speeds up and automates existing practices, reshapes information exchange, transforms social and economic relations and formations, and creates new horizons for cultural activity” (Kitchin & Dodge, 2011). The coded programs, tools, and packages comprising digital infrastructures are largely produced by the software industry. It produces the software used in data collection and processing, digitalization of processes, creation of virtual platforms and remote communication, and generating new digital services, processes, and phenomena.

The software industry is an indispensable component of the digital economy (Bukht & Heeks, 2017). It has been claimed that as a knowledge-intensive industry, competitiveness in this industry is based on ideas and design, and less on productivity or quality (Guzik & Micek, 2008). Therefore, studying the software industry builds an understanding of location behaviors and patterns in the emerging digital economy, heavily leaning on ICT-intensive knowledge-sourcing and virtual work practices (Aslesen et al., 2019), enabling place- and time-independent working (Popma, 2013).

Yet, the intraurban scale, such as neighborhood-level industrial location decisions, has received far less attention than regional or national scales (Arauzo-Carod, 2021). This scale is particularly relevant because the interplay between digital tools and physical proximity operates differently than at larger scales. In this paper, therefore, we explore how the degree of remote coordination explains the intraurban neighborhood preferences of the software industry.

Existing literature suggests that these companies are attracted by neighborhood qualities, such as localized networks, sources of knowledge, or local “buzz” (Bathelt & Turi, 2011), resulting in clustering of these industries. Moreover, intense debates focus on whether ICT can bridge or substitute access to these neighborhood qualities (Bernela et al., 2022). Although the resources and qualities attractive to software companies are unevenly distributed across neighborhoods (Arauzo-Carod, 2021), ICT may increase their perceived proximity within an intraurban context. However, this depends on whether access to those resources can be digitally substituted.

To understand the role of digital substitution in neighborhood choice, there is a need for empirical analyses that jointly examine companies’ neighborhood preferences and the substitutability of their activities. Understanding this dynamic informs decision-making in urban planning on how to mitigate the intraurban spatial effects of digitalization and digital economies while supporting applied analyses of how digital economies transform companies’ intraurban location choices. The main research questions in this research paper are:

- What kinds of explicit intraurban neighborhood preferences do software small and medium enterprises (SMEs) have?
- How do the ways companies coordinate remotely and substitute physical proximity with digital tools explain their neighborhood location preferences?
- What roles do city centers and suburban business parks play in the e-planning of local urban economies?

We present results from a 2025 survey of 94 small and medium sized software enterprises (software SMEs) in Tallinn, Estonia, studying their neighborhood preferences and remote coordination practices. In our analysis, we examined response distributions and compared model factors explaining the location preference in the city center or a business park using ordinal logistic regression (OLR)

21 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/article/does-virtual-work-decentralize-cities/404751](http://www.igi-global.com/article/does-virtual-work-decentralize-cities/404751)

## Related Content

---

### Principal's Letter to Parents: Take Kids off Social Networking Sites

Irene Chen (2012). *Cases on Educational Technology Integration in Urban Schools* (pp. 43-47).

[www.irma-international.org/chapter/principal-letter-parents/61706](http://www.irma-international.org/chapter/principal-letter-parents/61706)

### "Planning" or e-Planning?: Implications for Theory, Education and Practice

Ernest R. Alexander (2014). *International Journal of E-Planning Research* (pp. 1-15).

[www.irma-international.org/article/planning-or-e-planning/108866](http://www.irma-international.org/article/planning-or-e-planning/108866)

### A Rural Multi-Purpose Community Centre in South Africa

Jonathan Trusler and Jean-Paul Van Belle (2005). *Encyclopedia of Developing Regional Communities with Information and Communication Technology* (pp. 618-623).

[www.irma-international.org/chapter/rural-multi-purpose-community-centre/11452](http://www.irma-international.org/chapter/rural-multi-purpose-community-centre/11452)

### Police Service Crime Mapping as Civic Technology: A Critical Assessment

Teresa Scassa (2016). *International Journal of E-Planning Research* (pp. 13-26).

[www.irma-international.org/article/police-service-crime-mapping-as-civic-technology/158035](http://www.irma-international.org/article/police-service-crime-mapping-as-civic-technology/158035)

### Understanding New Landscapes: Support for Renewable Energy Planning

Ian D. Bishop and Sophie Atkinson (2012). *International Journal of E-Planning Research* (pp. 1-16).

[www.irma-international.org/article/understanding-new-landscapes/74820](http://www.irma-international.org/article/understanding-new-landscapes/74820)