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Abstract

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Author summary

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Introduction

[1] To characterize evolution of the computer industry, we examine the distribution of relative employment across cities in 1977 and how that distribution changes over time to 1992

There is no tendency of relative size distributions of urban computer employment to collapse, go bimodal, or fully spread. Overall computers exhibit some turbulence, with dramatic big winners and losers among cities. In attracting or repelling an industry, urban heterogeneity is important. Large, well educated cities near San Jose have much greater chances of attracting high-tech employment and less of losing it

[2] spatial innovation diffusion By using Bayesian survival models with time-dependent data of wind turbine deployment and firm foundation for 402 German regions between the years 1970 and 2015, we show that the spatial evolution of the German wind energy industry was more strongly influenced by local demand– pull than local supply–push processes.

The industry's initial locations are distributed relatively arbitrarily and unpredictably, as their needs in terms of resources and skills are diverse and distinct from the older existing industries (Boschma and Lambooy, 1999). Consequently, emerging industries are characterized by relatively high degrees of freedom in terms of location. In later extensions of the concept, the assumption of the randomness of locations was revised with greater importance assigned to regional conditions (Boschma and Lambooy, 1999; Fornahl et al., 2012).

larger local technological niches (at least from a demand perspective) are more likely to be formed in urban areas than in rural ones, which is in line with the work of Ha¨gerstrand (1965a,b). However, size is not the only regional characteristic that may matter in this context. Regions also differ in accumulated experiences and the presence of tacit knowledge with respect to products, as well as in actors' propensity share this knowledge among producers (Martin et al., 2019)

[3] The concept of absorptive capacity has also been applied in the TIS context in terms of the con-struction of capacity needed to transfer and implement a new

technology in the receiving country (cf.Van Alphen, 2011), with repercussions for the nature of system functions

[4not good paper] Invention, innovation and diffusion are considered as the three pillars of the theory of technological change and Schumpeter is considered as the father of the study of diffusion

Epidemic approach: The approach emphasizes that the adoption of a technology spreads like an infection among the potential adopters. By taking a homogeneous group of potential adopters as an assumption, it explains the adoption of any innovation.

To summarize the discussion, first, here the diffusion process is selfperpetuating as initial use stimulates further use. Second, it follows a disequilibrium path as the level of users is always lower than the number of potential users (Stoneman 2002).

The criticisms are mainly based on the fact that although the approach gives an idea of aggregate (industry or household) behaviour, it does not focus on the individual's (firm or household) adoption process

Rogers3, that divides adopters as: (I.) Innovators: first 2.5%, (II.) Early adopters: next 13.5%, (III.) Early Majority: following 34%, (IV.) Late Majority: next 34%, and the rest as (V.) Laggards

[5] Spatial diffusion is the process by which behavior or characteristics of the landscape change as a result of what happens elsewhere earlier. Spatial diffusion is the spread of the phenomenon, over space and timed, from limited origins

Contagious diffusion=> spatial autocorelation

expansion-type diffusion

the three geographic diffusion processes are (1) purely contagious where distance or adjacency is the absolute controlling factor, (2) purely hierarchical where size or urban position in the central place hierarchy is the absolute controlling factor, or (3) where the location of change is purely random. These are the pure or ideal forms of the diffusion process; all real diffusion processes are the result of a combination of these extremes.

The work by the communication sociologist Everett Rogers (1962, 1971, 1983) has emphasized the role of information, communication, formal and informal media, opinion leaders and social networks, and economic and psychological constraints on acceptance. Rogers's work stresses the decision mechanism of the potential adopter; the work of Rogers partitions the adopter's process of choosing to accept a new phenomenon or trait into five stages: stage 1–the potential adopter gains knowledge or awareness of an innovation; stage 2–persuasion is exercised to adopt; stage 3–a decision is made to adopt; stage 4–the decision to adopt is implemented; stage 5–the adopter confirms the decision to adopt. In Rogers's stage theory there may be a substantial time lag between when a potential adopter becomes aware of the new characteristic and when a decision is actually made to adopt.

Hägerstrand considered diffusion to be a fundamental geographic process: Whatever the phenomenon being diffused might be, one may consider it in the context of a larger universal process of spatial diffusion.

[6] Because new digital activities are rarely—if ever—captured in official state data, researchers must rely on information gathered from alternative sources. With this in mind, the overarching aim of this article is outlining an approach for analyzing the "new spaces and geographies" of digital phenomena and practices.

Literature review {#sec2} MAYBE SKIP THIS??

Materials and Methods

Multi-country analysis

3.2 Case study approach

Digital technologies and spatial structure: a global view

The impact of ICT on the US and the UK spatial structures

Discussion and conclusions

contrary to results from future studies regarding social media [7], web technologies did not exclusively spread from a central location.

[7] We see that the OSN spread almost exclusively from the original location (the capital Budapest, with an order of magnitude more inhabitants than the next size town) to various parts of the country in the early phase of the life-cycle. Later, diffusion became less mono-centric and other towns also emerged as spreaders. Our findings support the idea that spreading initially happens to large distances and becomes more local over time. This is illustrated and discussed later in Figure 2I.

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