

Residence, workplace and commute: Interrelated spatial choices of knowledge workers in the metropolitan region of Munich



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ARTICLE INFO

Keywords:

Knowledge typology
Knowledge workers
Locational revealed preference
Commute

ABSTRACT

Knowledge workers (KW), as important individual agents who embody, exchange, create and exploit knowledge, contribute to regional competitiveness and growth. To attract and retain them in a region, it is necessary to have a better understanding of their fundamental spatially-related behaviors including residence, workplace, and commute choices. In this study, we depart from a perspective of knowledge typology (analytical-synthetic-symbolic knowledge base) to investigate the heterogeneity of knowledge workers' residence, workplace, and commute choices. The case study was conducted in the metropolitan region of Munich. Various types of data are integrated: structural statistical and individually-based web-survey data; individuals' actual choices and their assessment of importance for each criterion; positional and relational data. We find that symbolic Advanced-Producer-Services (APS) workers tend to reside in central areas and use public transport or active modes to commute. In contrast, synthetic high-tech workers are found in relatively peripheral areas and depend more on cars to reach their workplaces. The spatially-related choices of analytical high-tech and synthetic-APS workers are positioned in between symbolic APS-workers and synthetic high-tech workers. We reach three conclusions: Firstly, the features of the knowledge base are evident in the spatial choices of knowledge workers. Secondly, there is a consistency of characteristics between interrelated spaces surrounding residence, workplace, as well as along the commute path of knowledge workers. Lastly, while the influence of the knowledge base has to be weighed against socio-demographic factors, different groups of knowledge workers clearly display distinct choices of residential location and commute mode. These conclusions may provide insights for urban planners and policy-makers regarding the attraction and retention of knowledge workers.

1. Introduction

Knowledge has become a crucial factor for production in the era of knowledge economies (Simmie, 2002). The capacity and speed of new knowledge creation constitute competitive advantages for knowledge-intensive firms, stimulating regional long-run growth (Bathelt and Glückler, 2011; Storper and Scott, 2009). Exchanging and creating knowledge often require face-to-face interaction between knowledge agents in “a specific time and space” (Nonaka and Nishiguchi, 2000, p. 19), since knowledge has a tacit component, which cannot be codified easily (Boschma, 2005; Polanyi, 1966; Spencer, 2015; Storper and Venables, 2004). Knowledge workers, as individual agents who embody, exchange, create, and exploit knowledge, are indispensable resources for innovation and forces for regional development (Vissers and Dankbaar, 2013). We define knowledge workers based on their employment sector and the complexity of their professional tasks. Firstly, knowledge workers work in high-tech industries or advanced-producer-services (APS), which are two main pillars of the knowledge economy

(Lüthi et al., 2010; Thierstein et al., 2008). Secondly, knowledge workers perform non-routine or highly complex tasks, and fulfill important functions in their organizations (Brinkley et al., 2009; Bundesagentur für Arbeit, 2010, p. 27).

The economic vitality of the metropolitan region of Munich is largely attributable to knowledge workers functioning as ‘innovation engines’ (Hafner et al., 2007, p. 40). However, Willems and Hoogerbrugge (2012) predict that this region will still have a large demand for knowledge workers in the future. Housing, employment, and mobility are three fundamental considerations determining whether one settles in a region for a longer period or not. To attract and retain more knowledge workers within the metropolitan region of Munich, it is necessary to have a better understanding of their choices of residence, workplace, and commute mode. Existing research on spatially-related behaviors of knowledge workers has been conducted either in different spatial scales, or within a specific spatial context like the Netherlands, Sweden, the United States, or Canada (Asheim and Hansen, 2009; Burd, 2012; Musterd, 2004; Spencer, 2015). In addition, existing studies on

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the driving force for the spatial process by knowledge workers are inconclusive so far (Frenkel et al., 2013b). On the one hand, knowledge workers revitalize and regenerate urban core areas, contributing to the concentration process (Brake, 2015). On the other hand, knowledge workers encourage urban sprawl via their residential location (Felsenstein, 2002).

We investigate the heterogeneous spatially-related choices made by different types of knowledge workers and aim to identify the traces of the knowledge base. Specifically, we wish to establish which kind of locations are ideal for which types of knowledge workers to reside in, and which commute mode they prefer to use. Furthermore, we discuss the underlying rationales for the choices they make. Our study may provide insights for policy-makers and urban planners by identifying the spatially-related revealed preferences of each type of knowledge workers.

The remainder of this paper is organized as follows: Section 2 elaborates our conceptual background and research hypothesis. We follow this by introducing our methodology, including the research design and methods of analysis, in Section 3. Section 4 presents the results of our analysis and a discussion of the implications. Finally, we reach our conclusions and remark on the research outlook.

2. Knowledge typology, sensitivity to distance, and spatially-related revealed preference

The comprehensive framework of analysis for studying spatially-related choices is shown in Fig. 1. Both the characteristics of individual decision-makers and knowledge typology influence the spatially-related choices of knowledge workers. Section 2.1 mainly focuses on the connection between spatially-related choices and the characteristics of individual decision-makers. Afterwards, the linkage between spatial choices and the knowledge typology will be elaborated in the subsequent Sections 2.2–2.4. Firstly, we introduce the analytical-synthetic-symbolic knowledge typology and discuss their different sensitivities to distance. Secondly, we introduce different modes of knowledge creation and the concept of ‘context’, and discuss their implications for various locational patterns of knowledge-intensive firms in different economic sectors. Thirdly, we emphasize the relevance of residence, workplace, and commute in the social learning of knowledge workers. Based on these theoretical and empirical findings, we come up with the hypothesis at the end of the section.

2.1. Spatially-related choices and characteristics of individual decision-makers

As shown in Fig. 1, spatially-related choices include the interrelated choice of residential location and commute mode (Cao, 2015), as well as the conditioning aspects including job location, commute distance/time and the car ownership (Lawton et al., 2013; Van Acker and Witlox, 2010). Characteristics of individual decision-makers include socio-demographics and mobility preferences of individuals. With respect to residential choice, each individual wants a favorable dwelling with good accessibility to current and potential destinations or opportunities (Thierstein et al., 2013). Individuals with certain socio-demographics and attitudes towards certain travel modes make different trade-offs. Firstly, family households usually seek residences with direct access to the natural environment to maintain children's optimal health and development (Cummins and Jackson, 2001). Younger knowledge workers tend to select the city center, whereas older knowledge workers tend to select the quiet neighborhoods in suburban areas (Andersen et al., 2010; Beckers and Boschman, 2013; Lawton et al., 2013). Regarding the relative importance of jobs and amenities in determining residential

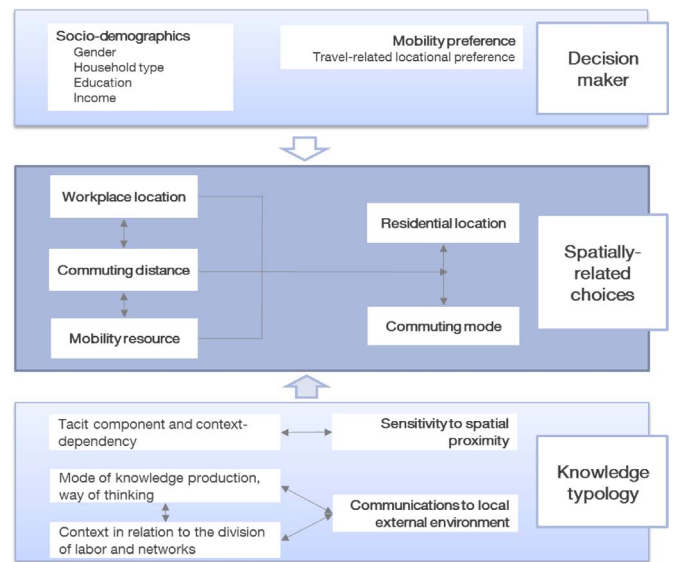


Fig. 1. A comprehensive framework of spatially-related choices and its relation to the characteristics of the decision maker and the knowledge typology.

location choice, Niedomysl and Hansen (2010) found that work opportunities are considered more important in making a migration decision among highly educated migrants compared to those with lower education. Secondly, mobility preference will simultaneously influence the choice of residential location as well as the commute mode. An individual who prefers cycling would live in neighborhoods with good cycling-facilities (Pinjari et al., 2009, p. 730). The residential and job locations simultaneously affect both the commute distance and the relative advantage of a certain commute mode among many alternatives in terms of travel time, which in turn influence the commute mode choice (Limtanakool et al., 2006). In addition, mobility resources, such as the ownership of a car and the time and monetary budget for the commute, also influence the choice of a certain mode (Paleti et al., 2013).

2.2. Knowledge typology and sensitivities to spatial proximity

Knowledge is a complex term. Knowledge that can be expressed with codified language is termed codified knowledge. Knowledge that cannot be (easily) codified is embodied in individuals. This would include subjective insights, as well as understanding and intuitions, and is termed tacit knowledge (Nonaka and Nishiguchi, 2000; Polanyi, 1966). However, the binary categorization of knowledge as either codified or tacit has been criticized as demonstrating an inadequate understanding of knowledge, learning and innovation (Asheim et al., 2011, p. 896; Johnson et al., 2002). To go beyond this simple dichotomy, Asheim et al. (2007) introduced the analytical-synthetic-symbolic knowledge typology, which “takes account of the rationale of knowledge creation, the way knowledge is developed and used... and the interplay between actors in the processes of creating, transmitting and absorbing knowledge” (Asheim et al., 2011, p. 897). Analytical knowledge, also known as ‘know-why’, concerns principles and causalities. It aims to understand and explain features of the material or natural world (Spencer, 2015, p. 886). Synthetic knowledge, often referred to as ‘know-how’, involves skills and procedures (Moodysson et al., 2008, p. 1045). Synthetic knowledge helps to solve practical problems by combining existing knowledge. Symbolic knowledge is related to “the aesthetic

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