Measures for knowledge-based economic development: Introducing data mining techniques to economic developers in the state of Georgia and the US South

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Abstract

The contribution of knowledge to economic growth and competitiveness has attracted increased attention. Publications with a topical focus on areas related to innovation have risen dramatically from 1963 to 2005, but more slowly in local and regional development journals. In contrast to the wide use of aggregate measures of innovation, this paper presents four cases presenting disaggregated knowledge-based approaches into the policy- and decision-making processes of economic developers in the state of Georgia and the US South. The first case uses information obtained from patents and publications to inform traditional out-of-area economic development recruitment strategies in a more knowledge-oriented direction. The second case exemplifies the use of data mining to identify top researchers as part of a strategic state economic development effort. The third case illustrates how local knowledge-based capabilities can be identified in cities not traditionally viewed as innovative. Nanotechnology-related knowledge assets in the southern United States are mapped and assessed in the fourth case. Disaggregated methods used in traditional strategies were most intuitively understood and used, but new knowledge measures were found to encourage local and state economic developers to begin to embrace new paradigms.
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1. Introduction

In recent years, increased attention has been given to the contribution of knowledge in processes of economic growth and competitiveness. In explaining economic performance in developed as well as developing countries, factors related to the generation, acquisition, sharing and use of knowledge are now attributed with a highly significant, if not determining, role relative to the conventional economic inputs of land, labor and capital [1]. The ways in which companies and industries manage knowledge to enhance capability and to stimulate innovation have surfaced as increasingly critical factors in business and economic success [2,3]. Moreover, in addition to formal codified knowledge, weight has been placed on the value of learning and the development of tacit knowledge through experience, collaboration and networking [4].

As appreciation has grown of the importance of knowledge in modern economies, a variety of measurement approaches have been formulated to assess knowledge stocks and flows and other knowledge-related measures associated with science, technology and innovation [5–8]. These approaches, using quantifiable indicators, are valuable in their own right to inform analysis and policy, as well as in complementing qualitative case studies to understand knowledge-related processes. Of course, knowledge can never be completely quantified given the intangible qualities associated with its development and use. However, substantial efforts have been undertaken to develop and validate quantitative knowledge proxies and tracking systems using a variety of indicators including publications (to measure research activities, including research collaborations and citation flows) and patents (to assess knowledge-based innovation and commercialization activities). Such measures have progressed from simple counts of patents and publications to complex network maps of co-authorships and econometric models (using patents and patent citations) of knowledge flows, university-industry linkages and commercial innovations (see, for example, [9,10]).

In this paper, we discuss the use of disaggregated measures of knowledge and innovation to four cases which introduce knowledge-based measurement approaches into the policy- and decision-making processes of local, state and regional economic developers in the state of Georgia and the US South. In each case, we employed data sources and techniques which were new to the economic development users. In the first case, data mining is used to develop knowledge-based information to reorient one of economic development's traditional strategies – out-of-area business recruitment – towards a more knowledge-oriented direction. The second case illustrates how data mining was used to identify leading researchers in an emerging technology of strategic interest for state economic developers. The third case is focused on identifying local knowledge-based capabilities in cities that are not traditionally regarded as being innovative. The fourth case maps and assesses nanotechnology-related knowledge assets in the southern United States.

Perhaps not surprisingly, as the broader diffusion of innovation literature amply illustrates in other situations [11], we find that the introduction of new methods of knowledge measurement to state and local economic developers is not without problems. The transition from conventional strategies of economic development using traditional information sources is neither rapid nor straightforward. We explain and understand this as resulting from issues associated with a field of practice rooted in old paradigms but challenged to shift to new ones. The following section considers how paradigms of practice have evolved within the economic development field in the US and the various kinds of information used to support applications of these paradigms. This provides both context and a framework for our subsequent discussion of the four cases. We conclude with a discussion of insights gained from our cases, including pointers that may assist in using data mining to develop knowledge-based measures for future economic development applications.