



# Spatial and temporal trends in information technology outsourcing



Arti Mann <sup>a,\*</sup>, David C. Folch <sup>b</sup>, Robert J. Kauffman <sup>c</sup>, Luc Anselin <sup>d</sup>

<sup>a</sup> School of Sciences and Computer Engineering, University of Houston Clear Lake, United States

<sup>b</sup> Department of Geography, Florida State University, United States

<sup>c</sup> School of Information Systems, Singapore Management University, Singapore

<sup>d</sup> School of Geographical Sciences and Urban Planning, Arizona State University, United States

## ARTICLE INFO

### Article history:

Received 13 November 2014

Received in revised form

26 June 2015

Accepted 28 June 2015

Available online xxx

### Keywords:

Clustering methods

Contagion effects

Economies of scale

Economies of scope

IT services

Outsourcing

Spatio-temporal analysis

Technology diffusion

## ABSTRACT

Over the last two decades information technology (IT) outsourcing has grown dramatically, and has emerged as a strategic choice for firms searching for ways to control their costs and maintain a competitive edge. The mechanisms driving its growth are not fully understood though. In this research, we employ an approach that focuses on geographic, temporal, and industrial proximity in a mechanism that identifies the process underlying the diffusion of IT outsourcing across firms within the U.S from 2000 to 2010. We focus on the role that firm location plays in the diffusion process, and use space-time clustering techniques from the epidemiology literature to understand the diffusion process. We identify 38 space-time clusters based on IT outsourcing announcement data and the locations of firm headquarters among U.S.-based firms. When supplemented with additional information, such as type of services outsourced, the metropolitan area of the headquarters, and related industry information; the results offer insights into various types of diffusion processes that have been identified in the literature but have not been documented to date in the empirical manner that we have been able to do.

© 2015 Published by Elsevier Ltd.

## 1. Introduction

Over the last two decades, as corporations have searched for ways to grow and maintain their competitive edge, outsourcing has emerged as a strategic choice for achieving those goals through cost control. According to Gartner (2014), one of the leading information technology (IT) research firms, global spending for IT services was approximately \$932 billion in 2013, and is expected to grow to \$967 billion in 2014, a growth of 3.8% from 2013. They further predicted that the market for business process outsourcing (BPO) services would grow by 6.2% in 2013. Additionally, Gartner (2013) predicted that the five-year compound annual growth rate through 2016 for worldwide BPO would be 5.3%. As IT outsourcing and offshoring have grown, so has the presence of service providers in the domestic and international markets. Onshore and offshore IT outsourcing has made a dramatic difference across various industries, such as banking and finance, healthcare, and telecoms. It has developed from being an inexpensive way to support non-

crucial services to being strategically important for businesses. While IT outsourcing has grown over time, the mechanisms driving this growth have not been clear.

IT outsourcing is a straightforward business choice, but its implementation for any particular firm is more complex. The process involves practical steps, such as identifying activities that can be outsourced within the firm, finding and interviewing external contractors, and conducting cost-benefit analyses. Other more sensitive issues are likely to emerge, such as ceding some control of the firm's business processes and initiating worker layoffs. These are difficult waters for a firm to navigate, and a firm's comfort level will likely increase when other firms lead the way. When firms imitate one another it is often the result of *agglomeration economies*. These are the benefits that firms receive from geospatial proximity to other firms. Another driver involves *contagion effects*, or knowledge transmission from close interactions.

In this article, we use spatial, temporal, and industrial proximity to explore the increasing use of IT outsourcing in the U.S. Using unique data on IT outsourcing announcements that appeared in the media between 2000 and 2010, and space-time clustering methods typically used to identify contagions, we consider the role agglomeration plays in IT outsourcing. A *space-time cluster* is defined as a set of events, such as IT outsourcing announcements,

\* Corresponding author.

E-mail addresses: [mann@uhcl.edu](mailto:mann@uhcl.edu) (A. Mann), [dfolch@fsu.edu](mailto:dfolch@fsu.edu) (D.C. Folch), [rkauffman@smu.edu.sg](mailto:rkauffman@smu.edu.sg) (R.J. Kauffman), [luc.anselin@asu.edu](mailto:luc.anselin@asu.edu) (L. Anselin).

occurring within a limited space and time (Lilienfeld & Lilienfeld, 1980; Selvin, 1991). IT outsourcing clusters occurred in all parts of the U.S. throughout the decade, and across many different industries. Combined, these clusters give context to the process of IT outsourcing in the U.S. and indicate the many ways in which this type of business activity spreads. Our goal is to identify the patterns of IT outsourcing diffusion within space–time clusters (Ye & Carroll, 2011), and to establish whether IT outsourcing diffuses across industries in the form of *scope externalities*, or within industries in the form of *scale externalities*. We ask: How does IT outsourcing spread? What are the underlying patterns? What is the role of proximity, as geographic nearness and industry similarity, in its diffusion?

Section 2 presents the theoretical frameworks used to understand the diffusion process of IT outsourcing. Section 3 introduces the data set and methods. Section 4 presents the results and analysis, and in Section 5 we discuss the patterns, and Section 6 concludes.

## 2. Theoretical background

For over two decades now, academicians have been conducting research on different aspects and issues associated with IT outsourcing. There have been only a handful of studies that have looked at the issues associated with diffusion of IT outsourcing though. Loh and Venkatraman (1992) and Hu, Saunders, and Gebelt (1997) explored the sources of influence in the adoption of IT outsourcing. Mann, Kauffman, Han, and Nault (2011) evaluated the presence of contagion effects in the diffusion of IT and business process outsourcing. In addition to prior research on IT outsourcing, prior work also seeks to understand geographic dispersion for high-tech industries and the collocation of clients and vendors (Arora & Forman, 2007).

Our main goal is to understand the diffusion patterns of IT outsourcing. Towards that end we use an inter-disciplinary approach that leverages the perspectives of contagion effects theory from epidemiology and the concepts of agglomeration economies from economics to develop new insights on IT outsourcing diffusion. These two perspectives are linked by their reliance on the geographic concept of spatial proximity. We further extend the concept of proximity to include temporal and industry similarity. This theoretical approach allows us to understand the diffusion of IT outsourcing from different vantage points.

*Contagion effects* are defined as “the spread of a particular type of behavior through time and space as a result of a prototype or model performing that behavior and either facilitating that behavior in the observer or reducing the observer’s inhibition in performing that same behavior” (Midlarsky, 1978, p. 1006). Prior literature, including Dornbusch, Park, and Claessens (2000), Midlarsky (1978), Midlarsky, Crenshaw, and Yoshida (1980), and Kauffman, Techatassanasoontorn, and Wang (2012), has shown that contagion effects can spread in different ways based on a population’s predisposing factors and characteristics. They include, strong or weak ties, physical proximity, and the presence of hierarchical effects. Prior research (Mann et al., 2011) has also shown the presence of contagion effects in the diffusion of IT outsourcing within three major industries (Broadcasting and Telecommunication, Healthcare services, and banking and finance) using one such stratifier – the firm size. *Contagion effects theory* posits the connectedness of adoption events over time, and offers a more refined expression of the diffusion of innovation theory (Kauffman & Techatassanasoontorn, 2009). Contagion effects are time-bounded, and may also be affected by spatial proximity and proximity in other ways that are not physical, such as industry similarity.

Contagion effects arise in two ways. The first is external to

business, industry, and geography, and is based on macroeconomic drivers (Goldstein, Kaminsky, & Reinfart, 2000). The second is spillovers due to interdependencies among market activities: aligned management interests or business activities in an industry, in a region, or across firms with similar interests. Spillovers usually involve tacit knowledge, and their transmission depends on distance. *Tacit knowledge* is ill-documented, uncodified, and can only be acquired through the process of social interaction. Consequently, knowledge spillovers may be related to the region in which the new knowledge is created (Anselin, Varga, & Acs, 1997; Feldman & Audretsch, 1999). This introduces the need for geographical proximity and encourages firms to concentrate in specific regions (Feldman, 1994).

The spatial clustering or *agglomeration* of economic activity is generally viewed as a sign of increasing returns and competitive advantage. Underlying the phenomenon of clustering are mechanisms that facilitate the interchange and flow of information between firms (Porter, 1990). These information flows or *knowledge spillovers* are sources of innovative output and productivity growth (Griliches, 1992), and also are one of the main reasons why firms collocate. Positive externalities associated with collocation may occur within or across industries, often leading to endogenous growth (Aghion & Howitt, 1998). Pavitt (1987) suggests that, due to its informal and uncodified nature, new knowledge flows more easily within a region than over great distances. As a result, there will be more knowledge spillovers in industrial centers, and this will lead to more innovative output.

In seeking to understand how location affects economic activity, empirical researchers have classified agglomeration economies into either localization economies or urbanization economies (Loesch, 1954). *Localization economies* are what Glaeser, Kallal, Scheinkman, and Shleifer (1992) define as *Marshall–Arrow–Romer (MAR) externalities*. They are external to the firm but internal to an industry within a geographic region and represent specialization and *economies of scale* (Arrow, 1962; Marshall, 1890; Romer, 1987). The concept of localization economies based on MAR and scale externalities is that the concentration of an industry in a region promotes knowledge spillovers among firms and facilitates innovation in the industry (Glaeser et al., 1992). This *specialization* and the related *specialized knowledge* encourages the transmission and exchange of ideas and information, whether tacit or codified, of product and processes through imitation, business interactions, and inter-firm circulation of skilled workers. In contrast, *urbanization economies* are external to industries but internal to geographic units such as cities, and represent diversity or *economies of scope* (Bathelt, Malmberg, & Maskell, 2004; Glaeser et al., 1992; Jacobs, 1969). Urbanization economies imply that the most important sources involving knowledge spillovers are external to the industry within which a firm operates. A more diverse industrial fabric in close proximity fosters opportunities to imitate, share, and recombine ideas and practices across industries. Also, the exchange of *complementary knowledge* across firms and economic agents facilitates experimentation in innovation.

Contagion and agglomeration theories can be brought together under the so-called *epidemiological triangle* (Merrill, 2013). This framework typically is used to outline the mechanisms by which a contagious disease spreads. The nodes of the triangle reference the *host* and *agent*, as well as the *environment* in which they interact. In the case of the disease malaria, for example, these nodes might reference people, a location with mosquitoes and standing water, and the malaria-causing parasite. Embedded within this framework are the concepts of direct transmission and indirect transmission of the agent to the host. Malaria is an example of *indirect transmission*, since mosquitoes are intermediary agents in the process, while influenza is airborne and typically exhibits *direct transmission*

Download English Version:

<https://daneshyari.com/en/article/6538455>

Download Persian Version:

<https://daneshyari.com/article/6538455>

[Daneshyari.com](https://daneshyari.com)