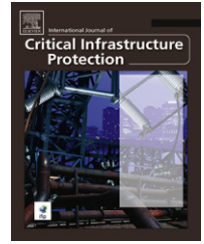


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Are we prepared for the economic risk resulting from telecom hotel disruptions?

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ABSTRACT

Large and small businesses in Seattle, Washington, as in most urban centers across the United States, increasingly rely on telecom hotels and related telecommunications centers to conduct business operations. What would be the economic impact to these businesses if a natural or man-made disaster were to make this infrastructure unavailable for a significant period of time? How long would it take for the owners of small businesses, which provide the foundation for economic recovery, to give up and move away? Are metropolitan regions prepared for this risk?

This paper draws on publicly available reports of telecom hotel investments to examine the economic risks that such telecommunications hubs pose at the regional scale. New York City and Seattle are two urban areas that depend on key investments in telecom hotels. In the Pacific Northwest, these assets are located downtown, primarily in the center of the urban real estate market of Seattle. Although the terrorist attacks of September 11, 2001 were directed at the World Trade Center in Lower Manhattan, collateral damage to a major telecommunications hub brought outages during and after the attacks that highlighted the serious risk posed to small- and mid-sized businesses from disruptions in telecommunications service. The Seattle case study illustrates the potential to learn from the experience in Lower Manhattan and apply this knowledge across the United States. Regional economic analysis of the benefits of and the means to protect small- and mid-sized businesses can provide the basis for strategic investments that minimize economic loss and reduce the recovery time.

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1. Introduction

The destruction of the World Trade Center complex in New York City on September 11, 2001 (9/11) was an unprecedented disaster at many levels. The impacts included the tragic loss of life and the destruction of a national icon, as well as immediate and long-term negative impacts on the economy. Although the target of the terrorist attacks was the Twin Towers, collateral damage to a power substation in World

Trade Center Tower 7 (WTC 7) and a key telecommunications hub in the Verizon Building near WTC 7 resulted in the loss of communications services for a large part of Lower Manhattan during and after the attacks, which exacerbated the economic impact. The outage immediately increased the difficulty of coordinating the response to the disaster—more than 300 firefighters died after their communications systems were rendered non-operational [1]. According to a Department of Homeland Security report [2], the impact of 9/11 nationally

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was a 0.5% drop in real GDP growth and a reduction of 598,000 jobs. Thompson [3] has projected these economic losses through 2004.

After 9/11, emergency management professionals asked whether the potential existed for similar telecommunications infrastructure disasters to cause significant economic disruptions to their local economies [4]. Accordingly, we identified a telecommunications hub in Seattle, Washington, similar to the one in Lower Manhattan, where a disruption could have serious economic effects on Greater Seattle, perhaps even the Puget Sound Region. Located in downtown Seattle, this Internet hub has evolved from its beginnings as a telephony hub to become a major component of the telecommunications backbone in the Pacific Northwest. Its presence raises the question: What would be the economic impact to Seattle's businesses if this hub were to be damaged or destroyed?

This paper applies findings from the telecommunications service disruptions in Lower Manhattan to the circumstances presented by the concentration of telecommunications assets in Seattle. The next section discusses the local and regional risks created when the physical infrastructures of telecommunications hubs are developed through private business logic and fortified through the national lens of risk management. This is followed by an examination of a large telecommunications hub in Seattle. When compared with the experience in Lower Manhattan, the Seattle case study presents a rationale for regional risk analysis, including a generalized model of public and economic risk that can be applied to regions across the United States. The paper concludes with policy recommendations, and highlights steps that should be taken in the short term to address the risk.

2. Evolution of telecom hotels

Advances in telecommunications technologies have led to the rapid industrialization of the United States and have contributed to its unprecedented prosperity, beginning with the proliferation of telegraphy during the Civil War and exploding with the commercialization of the Internet in the 1990s [5]. As the US telecommunications system emerged, laws and regulations were established to protect the public interest. However, at times, legislation and regulation have struggled to grasp the social, political, and economic implications associated with new telecommunications technologies. The Telecommunications Act of 1996 is an example. It formally ushered in the deregulation of the telecommunications market, mandating that existing carriers make their assets, including networks, equipment, and space, available to competitors [6]. The motivation for the mandate was economies of scale—at the time, it was not obvious that aggregation would potentially create single points of failure in telecommunications infrastructures.

As an example, the Pacific Northwest region, often considered to be the tenth largest economy in the world [7], is highly dependent on the telecommunications infrastructure that supports a vibrant high-tech sector, including major software, e-commerce, and aerospace companies [8]. Currently,

more than 1000 carriers and Internet providers in Washington State support the technology sector [8]. These include local and national carriers, as well as commercial entities that own and operate the sub-oceanic cabling for international telecommunications.

As in many metropolitan areas across the United States, Internet connectivity for thousands of businesses in the Pacific Northwest takes place through Internet Connection Points—Network Access Points (NAPs), Internet Exchange Points (IXPs), or Metropolitan Area Exchanges (MAEs)—that provide access to the Internet backbone [9]. The first five NAPs in North America were established in the 1990s in Chicago, New Jersey, San Francisco, San Jose, and Washington, DC [10]. IXPs evolved from and encompass the original NAPs. Over time, additional centers that market a range of co-located telecommunications and data storage services have proliferated across the United States (see Table 1). It is not unusual for metropolitan areas to house ten or more such facilities, while also hosting a regional IXP.

The Internet was initially developed by US government agencies with access afforded to universities and research centers. The privatization of Internet access and the transfer of its management began in the late 1980s and continued through the 1990s [12]. Access points were sold to private firms, mainly established telecommunications corporations. Economies of scale along with market expansion motivated the 1996 Telecommunications Act requirement that telecommunications corporations share their assets with other firms. Without competition, economies of scale would result in the classic market inefficiencies associated with monopolies. Competition brings the expectation of a virtuous economic cycle of falling prices, investment in technology, and reduced barriers to entry for new competitors.

Access points, and the competitors and related firms they host, are commercial enterprises. Their owners and operators promote and market the facilities using the same approaches as in other lines of business. Currently, any person interested in learning more about such centers could, through an online search, find an interactive map of centers across the United States. The person could click on a button on the map indicating the number of communication hubs, such as “meet-me rooms”, telecom hotels, and other data centers, in any metropolitan region. The links lead to pages with the complete addresses of each facility and profiles of the available services [11]. Companies that operate access points publicize this information to attract business. In Seattle, businesses that are interested in connecting to the Internet backbone have several options, but most of these businesses have found their way downtown, to the Westin Hotel [13].

2.1. Telecom hotels

Telecom or carrier hotels, such as the Seattle Westin, are shared data center facilities where data communications media converge and interconnect. These data center facilities go by many names, including telecom hotel, collocation point, carrier hotel, data center, commercial Internet exchange, cyber hotel, and network exchange center [14,15]. The Telecommunications Act of 1996 opened collocation points for telecommunications exchange; meet-me rooms are

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