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Monica J. Garfield

University of South Florida, mgarfiel@coba.usf.edu

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Factors that Effect the Impact of State Telemedicine Policies on Telemedicine Activities

Monica J. Garfield, IS/DS Department, College of Business and Administration, University of South Florida, mgarfiel@coba.usf.edu

Abstract

Policies that govern the telecommunications industry will significantly impact the use and evolution of IT. Although there is substantial research on telecommunications policy at the national level, very little has been done at the state level. A major policy initiative at the state level has been the creation of a telemedicine industry. This research piece studied factors that effect the impact of state government *telemedicine* policy on telemedicine activities.

I. Introduction

The telecommunications industry and the policies that govern it have a tremendous impact on IT. While there is a necessary role for both government and private industry in the creation of large telecommunication networks (Anderson and Schement, 1995, Nelson, 1996), historically these networks have been regulated by federal and state policies. Though much research has been done on the formation of telecommunications policy at the national level (Cats-Baril and Jelassi, 1994; Petrazzini, 1996; MacMahon, 1995) very little has been done at the state level (Dholakia and Dholakia, 1994).

Each state has put together its own portfolio of telecommunications policies. These telecommunications policies have covered a wide range of activities including telemedicine initiatives. Telemedicine has been the focus of much state activity for a variety of reasons. Medical licensure is done at the state level and subsequently, policies and initiatives that govern the use of medicine are frequently established at the state level. As the population of the U.S. has expanded and the average age has risen the demand for healthcare has also risen. State governments have also become more aware of the health needs of the rural areas within their state. With advancements in technologies, telemedicine has become one option to enable states to better meet their healthcare needs.

Telemedicine

Telemedicine can be defined in a variety of ways (Table 1). This research limits its scope of telemedicine to: the use of telecommunications (specifically, interactive video programs) in the delivery of patient care and medical diagnosis.

In the US, many states have put forward telemedicine policies, which have meet with varying success. It is unclear what factors make one state' telemedicine policy

more successful than others. This suggests that preliminary exploratory research into state telemedicine policy would be beneficial. This research was driven by the following research question:

RQ: What factors effect the impact of state government telemedicine policy on the telemedicine activities?

III. Research Methodology

In order to best answer the research question raised in this study, a case methodology was used. This case study employed the following methods to enhance both the validity and the reliability of the findings:

1. Triangulation of sources
2. Triangulation of methods
3. Credibility checks

Triangulation of sources included interviewing members from a variety of stakeholder groups. Triangulation of methods was achieved by using two forms of qualitative methods (secondary source analysis and interview data). Credibility checks were made by informants in all four states. Internal validity of the findings was further enhanced by using multiple states and building explanations across and within states.

Site Selection

In order to gain breadth of data, states were selected that varied along type of telemedicine policy in place and telemedicine activity levels. The policies of all 50 states where categorized into three broad categories (Dholakia and Dholakia, 1994). The three categories were visionary informatics, coalition-building, and no significant activity. After all fifty states were classified raters verified state classifications (inter-rater reliability was 92.86%).

Final categorization of States based on telemedicine policy and activity

Due to the large number of states categorized as having no significant state policy involvement, these states were further classified as either states with low telemedicine and medical activity or states with high telemedicine and medical activity. These activity levels were based on medical journal counts and telemedical and medical patent counts. After removal of states that were not clearly classified in terms of policy type or activity level the following states were left (see Table 2).

Identification of state factors that impact Telemedicine usage in state

Through early secondary data analysis it became apparent that several key characteristics of a state were possible enablers or facilitators for telemedicine).

The desire was to locate states that were somewhat comparable across these various mitigating variables and did not show an outlying score in any of the mitigating variables. After careful consideration of each state and its mitigating factors Georgia, Pennsylvania, Ohio and Wisconsin were selected (see Table 4).

IV. Data Collection

For the four states selected for case studies the following data sources were utilized:

1. Secondary Source Data
2. Phone Interviews

Secondary Source Data

In order to gain a richer picture of the telemedicine environment within the selected states additional literature surveys were conducted. They included searches in popular press, medical and academic journals, and web sites as well as state legislative bills, minutes from telemedicine task force meetings, and internal evaluations of state-initiated telemedicine systems. These documents provided a rich background to gain an understanding of the telemedicine climate and activities within the state. These documents were also used to identify potential case informants.

Interview Data

Although the secondary data provided insight into the activities of the four states it was also important to speak with individuals who were active in telemedicine-related issues in the states. At least one informant from each of the following broad categories of people in each state was interviewed:

1. Telemedicine Users
2. Telemedicine Program Leaders
3. State Officials

Interviewing Informants

Prior to conducting the interviews, a semi-structured script was written. This script posed some open-ended questions in order to elicit candid responses. During the interviews, the script was present but due to the varying perspectives of the informants and the native language they used for describing telemedicine, all interviews took on an open, reflexive tone. Because data analysis and data collection overlap when utilizing this form of study, the

focus of the interviews changed as research themes emerged and developed.

V. Data Analysis

Data collection and data analysis were conducted in an iterative and overlapping fashion. As data analysis surfaced new theory and sharpened the understanding of the factors that impacted state policy on telemedicine activities, the focus of the data collection efforts evolved. Most interviews took place over the phone with the exception of the informal meetings with the staff at the Medical College of Georgia. All phone interviews were taped with the exception of one. During the one un-taped interview, notes were taken. All taped interviews were transcribed. The NUD*IST software package was used in the coding of the data.

Evolution of Coding Schema

The first round of transcript review took place after all of the first state's (Georgia) interviews were transcribed. A preliminary coding scheme was developed. This scheme went through four iterations until it appeared to cover the important issues covered in the first set of interviews. After an initial reading of the second set of interviews (Pennsylvania) took place it became apparent that the coding scheme needed to be altered. Portions of the original coding scheme were clarified, some removed and new categories included. For the third state's (Ohio) transcripts the coding schema was slightly altered and the transcripts were coded. At this point the two original states had to be re-coded (Pennsylvania and Georgia). Finally the fourth state's (Wisconsin) transcripts were coded utilizing the final coding schema and no changes were necessary to the schema.

Supplemental Data Analysis Tools

The data analysis efforts were primarily focused on information directly embedded in informant interviews using secondary documents to give contextual understanding of the environment. Additional tools (brief factual case write-ups and interview and state overview tables) were used to reduce the volume of data associated with each case.

VI. Findings

Analysis of the data from the 35 interviews surfaced several factors that appear to influence both the actions of a particular state and the impact of those actions. These significant factors (ones mentioned in at least 25% of the interviews) are listed in Table 5. One additional factor that came up repeatedly in secondary sources and cannot be ignored, was the amount of financial support the states put into the telemedicine efforts. This factor will also be discussed in the findings.

Telecommunications Infrastructure Within State

The most critical factor in the implementation of telemedicine systems is creating a telecommunications infrastructure. Once the telecommunications infrastructure is in place and accessible to the medical facilities (both physically and economically) the other factors that impact telemedicine networks can be considered.

Those states that have not yet developed a state-wide telecommunications infrastructure have found it very difficult to support telemedicine activities. In some cases the state (GA and WI) has implemented its own high-speed network (typically aimed at connecting educational facilities) that it can make available to healthcare facilities. Clearly, the mere presence of such a system without access to it (i.e., WI) does not facilitate telemedicine projects. Other roles the state can play are in negotiating favorable terms with the various telecommunications providers (OH) or establishing a dialogue between the various entities in order to create a telecommunications system that is less fragmented and more interoperable (PA).

Correctional Facilities

States have also found that the use of telemedicine in correctional facilities is a win-win situation. All four states have some form of telemedicine operating in their correctional facilities. These programs may give the state an opportunity to learn about telemedicine. Unfortunately, because the prison system is different from other telemedicine environments these learnings may not always apply to other systems. Some states have found that they can successfully integrate their correctional program into a statewide telemedicine program (i.e., GA) while others are testing isolated telemedicine pilot projects (PA, OH, WI). When the system is built in isolation it runs the risk of not learning from earlier mistakes made by other telemedicine systems, and it may have limited impact on other telemedicine systems. Functional telemedicine systems in the correctional facilities also appear to improve the relationship between the "civilian" doctors and the prison system doctors (i.e. OH). Unfortunately, if a telemedicine system does run into technical or operational difficulties, the rift between the healthcare professionals at the two locations may erode (i.e. WI).

Champion

It has long been known that large information systems, particularly those that impact the current behavior of the actors in an organization, benefit from the presence of a champion. This research has found that telemedicine benefits from 3 different types of champions (system-wide, and site-specific user and technical champions). Early in

the program a system-wide champion is essential to rally interest in the program and to coordinate its roll out. Having a champion that represents the telemedicine system can certainly be beneficial (GA), but if it is at a site on the telemedicine network it can also create a hierarchical relationship among the sites that may stifle the project.

Telemedicine systems appear to not only benefit from a system-wide champion but to also rely heavily on user and technical champions within *each* medical organization that takes part in the telemedicine system. Although the user champion can play a significant role in guiding the use of the system, interesting others in the system, and gaining organization-wide acceptance of the system, they do not appear to be as important as the technical champions. It is the technical champions that ensure the system runs smoothly and effectively, which is critical to gain user buy-in to the system (GA). Furthermore, there are different types of user champions at different telemedicine sites. The remote sites may find that their user champions are lower level medical staff who do not always carry the clout necessary to influence the use of the system the way the higher level medical staff does. Typically, the user champions that can make a significant difference in the use and acceptance of the telemedicine system reside at the consulting end of the telemedicine system and are typically highly specialized doctors (OH).

User Buy-in

Like many other large information systems, telemedicine networks found that it was critical to establish user buy-in for the system to succeed. One way user buy-in was established was through system features that aided users in their work on the system (i.e. ease of use and convenience of the system). Furthermore, systems that matched the current referral patterns of the healthcare facilities tended to gain higher user buy-in due to the comfort level the user had with the distant site. Finally, projects tended to see higher user buy-in when the site had a financial stake in the system (GA). This tended to facilitate the institutions' desire to tie the program into a business plan, which in turn led to a greater user understanding of the effectiveness of the system. Those states that did not help sites focus on the tie-in for telemedicine to their business plans found that they had systems that were often underutilized (PA). Furthermore, when technological and operational problems occur, user buy-in was eroded (WI).

Competition in Healthcare Market

The medical field in general is a highly competitive field and some geographic regions have a higher degree of competition than others. Those states that show a high degree of competition in the healthcare market appear to benefit the least for government involvement. In most cases

if there is a business case for the use of telemedicine, the health care facilities have designed and implemented their own systems (PA). This is not to say that state aid in the way of building a stronger telecommunications infrastructure, reducing telecommunication rates, or passing legislation with respect to licensure or reimbursement issues would not facilitate the use of telemedicine in these states, but there is a lower need for a statewide telemedicine project per se. Furthermore, task forces to facilitate the distribution of information between the various healthcare entities with regards to telemedicine may also be futile. In many cases these healthcare entities want to guard information that may enable them to be more competitive. Finally, it is useful to keep in mind that the healthcare market is evolving rapidly and the impact of hospital purchases and managed care may have broad reaching impacts on the use of telemedicine (making any form of a closed system highly volatile and unwise).

Timing of the Government

The timing of when the government decided to implement telemedicine initiatives played a significant role as to the impact it had on telemedicine activities. If the healthcare facilities have not yet begun to show interest in telemedicine, the state may benefit from waiting for the facilities to show more interest in telemedicine prior to implementing a system. The state can also take actions to encourage medical facilities to become interested in telemedicine through conferences or task forces.

The ideal situation is when there is already some telemedicine activity in the state (i.e., some medical facilities have become interested in telemedicine) and then the state facilitates the growth of these programs. Those states that entered into telemedicine initiatives at such a time (PA and GA) found that it worked in their favor. At the time most major healthcare facilities did not have a high vested interest in current, in-house telemedicine systems, but many were looking into the use of telemedicine. Some found the state network a good way to learn about telemedicine (PA) while others found it to be the network of choice for their institution (GA).

Finally, if the medical facilities are pretty well entrenched in their own telemedicine projects, the state may consider facilitating those projects already underway. The state can still play an active role in facilitating telemedicine via legislative actions for reimbursement, licensure, liability, etc. and negotiating telecom rates.

Financial Support

Although most informants did not specifically address the issue of financial support it is clear that a large sum of money to develop a telemedicine network helps in the development, implementation and growth of one. In determining the requisite level of financial support, state governments need to keep in mind that to gain adequate buy-in, the telemedicine sites must have some stake in the

network (e.g. through financial outlays or through potential economic benefits associated with the system), and they must be accountable for their use of the network.

VII. Conclusions

Understanding how a state can impact telemedicine is a highly complex task. What works for one state may not work for another and what works at one point in time for one state may not work at a different point in time. Yet the findings of this study help identify the key factors a state must consider when implementing a telemedicine system and how they may address these issues (see Table 6). Many of these factors will impact the implementation of any telemedicine system, regardless of who is doing the implementation (i.e. telecommunications infrastructure, champion, user buy-in, financial investment, use of system), whereas others are more specifically targeted to a statewide initiative (timing of state, competition in healthcare market, correctional facilities). These findings are not an all-inclusive list of factors that impact telemedicine projects but represent the more critical issues facing a state telemedicine project. Certainly telemedicine has some specific features that make it different from other large information systems, but many of the learnings associated with the implementation of any large information system that impacts multiple organizations and changes the behavioral patterns of the user can be applied to telemedicine and this literature should not be overlooked by telemedicine program managers.

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Table 1: Telemedicine Definitions

Definition	Source
Telemedicine is a method of delivering health care services to distant patients through the blended use of telecommunications, clinical systems, and on-site and remote medical providers.	Wagner, 1995
Telemedicine can be broadly defined as the use of telecommunication technologies to provide medical information.	Perednia & Allen, 1995
Telemedicine is the application of telecommunications and audio-video technology to provide medical services.	Baer, et al., 1995

Table 2: Potential Case Sites

Category	States
Visionary Informatics	Georgia
Coalition Building	Colorado, Pennsylvania, Texas
No state policy activity but high levels of other telemedicine activity	California, New York, Ohio, Illinois, Massachusetts
No state policy activity and low levels of other telemedicine activity	WI AR IO KY MS MI ME MO NB NH ND SC VA NV AZ WY AL AK DE HI ID IN NC RI VT WV MT

Table 3: Factors that May Affect How State Telemedicine Policy Impacts Telemedicine Use and Underlying Mitigating Variables Used In Matching

Factors and Underlying Mitigating Variables
State Demographics <ul style="list-style-type: none"> Density of Population: % in metro Size : Population
State Medical Infrastructure <ul style="list-style-type: none"> Doctors/100,000
Correctional Facilities <ul style="list-style-type: none"> Prisoners/10,000
State Distribution of Wealth <ul style="list-style-type: none"> State expenditures/1,000

Table 4: Mitigating Data For Case Sites

	GA	PA	OH	WI
Population (1,000)	7,486	12,020	11,186	5,224
Rank in U.S.	10	5	7	18
% in Metro Areas	68	85	81	67.7
Rank in U.S.	27	11	18	30
Doctors/100,000	196	273	219	217
Rank in U.S.	32	7	19	25
Prisoners/10,000	48	27	40	25.2
Rank in U.S.	10	34	19	39
State expenditures per capita	\$2,721	\$3,209	\$3,178	\$3,292

Table 5: Significant Factors in Telemedicine Activities

Significant Factor in Telemedicine Activities	% of Interviews that Discuss this Factor
Telecommunications Infrastructure	56%
Correctional Facilities	38%
Need for Champion	38%
User Buy-In	38%
Competition in the Healthcare Market	28%
Timing of Government	25%

Table 6: Findings and Potential State Action

Factor	Finding	Potential State Action
Telecommunications Infrastructure Within State	The state needs to aid healthcare facilities in gaining access to a low cost, high quality telecommunications infrastructure.	<ol style="list-style-type: none"> 1. Directly improve telecommunications infrastructure 2. Negotiate with telecommunications providers for reduced rates and integrated statewide network
Correctional Facilities	Telemedicine for correctional facilities is typically effective but not always comparable to other environments.	<ol style="list-style-type: none"> 1. Potential for first telemedicine system in state due to high success rates of such systems 2. Bear in mind its unique environment that may not lead to understanding use of telemedicine in other environments
Champion	A network of site champions in conjunction with a system-wide champion is essential.	<ol style="list-style-type: none"> 1. Establish a champion for statewide system 2. Create network of champions (technical and user) for telemedicine sites
User Buy-in	User buy-in is created by linking the system to a business plan and by making the system easy to use (convenient, reliable, etc.).	<ol style="list-style-type: none"> 1. Need for system to be accessible and reliable 2. Establish links between system and overall business plan 3. Make sites accountable for use of system
Competition in Healthcare Market	Competition reduces the desire to collaborate with other facilities on a telemedicine project and it also inhibits the sharing of knowledge.	<ol style="list-style-type: none"> 1. Lower likelihood of successful statewide system in highly competitive market. 2. State focus in competitive markets may be on legislative actions and negotiation position (for telecommunications and insurance providers) to facilitate use of telemedicine.
Timing of the Government	The state can facilitate the use of telemedicine but, at this point in time, may no longer be successful in establishing a statewide program (if the healthcare facilities in the state have a vested interest in their own in house system).	<ol style="list-style-type: none"> 1. The state is most effective when private institutions have begun to learn about telemedicine and state facilitates such learnings. 2. Once private networks are well established, chances of a successful statewide telemedicine system diminish.
Financial Support	Financial support for a telemedicine system can increase its chances of becoming a successful system.	<ol style="list-style-type: none"> 1. Without adequate financial support statewide systems are less likely to succeed.