Factors Influencing the Perception of Information Technology Strategic Alignment of
Information Technology Leaders in Small Cities

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Howard Scott Dunn

M.S., Florida State University, 2001
B.S., University of Alabama at Birmingham, 1993

This dissertation, "Factors Influencing the Perception of Information Technology Strategic Alignment of Information Technology Leaders in Small Cities," by Howard Scott Dunn, is approved by:

Dissertation Committee Chair

David R. Gibson, Ph.D.
Professor of Mathematics and Computer Science

Committee Members

Nicholas Luke Fowler, Ph.D.
Assistant Professor of Public Policy and Administration
Boise State University

William Todd Watson, D.P.A
Information Security Officer
University System of Georgia

Dean of the Graduate School

James T. LaPlant, Ph.D.
Professor of Political Science

ABSTRACT

The rapid expansion of technology over the last few decades has changed individual expectations of both private and public sector entities. Municipal organizations are feeling the pressure to respond to a citizenry that is accustomed to around the clock service and near-instantaneous response when demanding information or services. To address such, organizations must ensure a properly placed and strategically aligned information technology function. This is of particular concern to small cities where budgets are small, talent is difficult to obtain, and leadership is not well versed in the benefits of information technology. This inquiry investigates the perception of information technology strategic alignment among small city technology leadership. Factors influencing that perception are considered, and the relationship to actual observable strategic alignment is studied. This study builds upon a noted lack of research in this regard on smaller public sector entities.

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DEDICATION

To Mary for the eagle-eyed proofing and constant support.

To my brother, Andrew, for the inspiration and occasional kick in the pants!

To Ray and Marjorie Dunn, my parents, for absolutely everything.

Chapter I

INTRODUCTION

The intent of this research is to investigate the level and perception of strategic

alignment within small city governments. At its most basic, strategic alignment can be

defined as the ability of an organization to align information technology resources with

the strategic planning created by the governance function in preparing for the future

growth of the organization. Strategic alignment of information technology is a well-

studied issue within the business management space (Wagner, Beimborn, and Weitzel

2014). It is consistently a concern expressed by private sector information technology

leadership when surveyed. However, the work done to study strategic alignment in the

public sector is considerably smaller. While there are obvious differences between

private and public sector entities, many business functions would be mirrored in

government and non-profit organizations. Clients must be assisted, employees must be

paid, and inventory must be tracked, whether a retail store is being considered or a city's

public works department. There are, however, critical differences when considering the

municipal governments of cities with populations of less than 50,000. Challenges that do

not exist for large corporations or metropolitan areas can hamper the ability for

technology to meet organizational goals (Wagner, Beimborn, and Weitzel 2014). In

reviewing the literature concerning the strategic alignment of information technology at

the small city government level, the research is minimal and warrants augmentation.

This does seem rather surprising given technological advances made in the last several decades. Connectivity, while not ubiquitous, has increased dramatically with most areas of the country having some level of broadband service (Zickuhr and Smith 2012). Similarly, cellular networks have expanded at geometric rates. One report suggests that the cellular capacity increased 1000x within the last decade (Li et al., 2014) with anticipated efficiency gains of 50 to 100 times within the next decade as industry moves towards fifth-generation (5G) devices. Rural areas that once had no access to wired network access through cable or digital subscriber lines now have access to third and often fourth generation networks. Previously, only expensive satellite network access existed to serve this segment of the country. Commensurate with that growth, smart phones and tablets supporting both wireless Internet and 3G/4G cellular connections have grown rapidly in popularity and are in some cases replacing the traditional desktop. Wearables, or personal Internet-aware electronics, are also expected to continue to grow in acceptance with devices like Google Glass and "smart" watches leading the way. An issue facing many small and rural areas is that of connectivity to individual's homes. Companies are not often willing to spend the funds needed to build out infrastructure to areas that are sparsely populated. This is known as the "last mile" problem. While the problem has not been completely solved, it certainly seems a less daunting task than in times past. This is particularly true regarding the more rural areas of the country when one considers wireless broadband options that are established as public/private partnerships. Examples would include the South Georgia Information Technology Authority that provides wireless broadband to citizens within a five county

region in rural southwest Georgia ("OneGeorgia Press: Governor Perdue Announces Broadband Award for SGRITA" n.d.).

Citizens that have become accustomed to instant service as provided by the Amazons and eBays of the world expect a similar responsiveness by their governments. Just as most other real life needs can be addressed with the click of a mouse, the average citizen is not likely to have any interest in going to their local government office and standing in line to wait on a particular form to be processed. These fundamental changes in what the citizenry expects in regards to service and what government agencies provide is often termed e-government. This term suggests an understood mandate for governmental agencies to leverage information technology to increase access, heighten transparency, and improve efficiencies in the delivery of basic services to their constituents.

A concrete example of this would be the proliferation of agency social media sites following the Open Government Directive of 2009 (Lee and Kwak 2012). Striving to promote transparency, participation, and collaboration with the nation's citizenry, nearly all federal agencies maintained profiles on popular social media sites by 2010. There were and are challenges in how an online presence is deployed including; time invested, funds expended, and expertise required (Lee and Kwak 2012).

E-government, however, goes much further beyond some basic business case for improved and efficient information sharing. By the proper deployment of information technology, government at any level can better empower the individual citizen. This is a far grander scheme than simply making the latest water and utility signup form web enabled. E-government, at its core, possesses the potential to alter radically how people

interact with governmental agencies and their fellow citizens. This transformative aspect of e-governance cannot be understated and should be pursued aggressively (Gajendra, Xi, and Wang 2012). If one accepts that a more participatory government is closer to a democratic ideal, then e-government offers increased potential to realize that ideal for all by augmenting existing methods of access and services.

A highly-connected populace will have great ramifications on the way government develops the goals for their specific units (Reddick 2009). Cyberspace is no longer a new and unexplored territory best left to the technical elite. Constituents will expect an experience like that found in the private sector. There is little concept of an 8AM - 5PM operating window. Agencies will be expected to have a 24 x 7 presence. Flexibility will be assumed, and fees can be paid with online check, credit card submission, PayPal, or perhaps even digital currency like Bitcoin. Support should be immediate and include Frequently Asked Questions (FAQs), telephone call-in, and online chat. Of course, all of this will be in addition to the needs of those that have no interest in the supposed benefits promised by e-government.

Agency leadership will then be tasked with developing strategic plans for meeting these goals. It is difficult to imagine that any agency planning will not include information technology as a critical component. This is a much different view of technology than was held in the past of mainframes and punch cards. While technology has certainly played a role in the delivery of government services for a considerable amount of time, it was not transformative in the sense of how the individual citizen interacted with the governmental agency. John Q. Public had little knowledge of whether or not the form he turned in at the Division of Motor Vehicles was just placed into a

physical filing system or digitized sometime later in the day. However, the Internet has exposed processes to the citizen consumer and often mitigated, if not wholly replaced, the role of the former line worker. Such a transformation, however, is no mean feat.

Indeed, the seamless transition of a spatially-bound and paper-process orientated public sector to one of anywhere and anytime is complex. It is a challenge to experienced administrators that must first learn how to think about service delivery in a completely new way. In doing so, they then must reconsider the entire manner of how their organization may best be managed to foster the required change. Goals have to be updated and well-articulated. Information technology must then "fit" to ensure the organization the best chance of evolving. Often this evolution necessitates a new role for the technology leader in an agency. Whereas prior the position may have been seen as strictly operational, the IT leader is now expected to provide guidance at the strategic level. Technology has become too complex and expensive to minimize, or at worst disregard, its importance at the highest level of organizational governance (Jafari 2014). Investment in IT can often require beggaring other organizational goals if not planned appropriately. This is the essential concept of information technology strategic alignment. An organization can be considered strategically aligned if information technology is positioned to allow the organization to meet its goals in the most efficient and timely manner. A misaligned organization at any size will fail in such and possibly experience what Oh and Pinsonneault refer to as "performance erosion" (2007).

Obviously, the strategic alignment of information technology should therefore be of concern to administrators at every level of government. This has been the case in the private sector for quite some time. If we accept the concept of fiscal decentralization that

suggests governmental services should be provided at the lowest level that makes sense, then even at the city or county level, the strategic alignment of information technology cannot be dismissed as simply something reserved for the major metropolitan areas (Oates 1999).

It is arguable that strategic alignment is even more critical at the lower levels of government when several aspects are considered. Often, the governance structure found in city or county entities is only part-time. This is particularly true in those localities having small populations. If there is a council/administrator style structure in the organization, the mayor and council may be reliant on the administrator and team to implement completely the strategic plans they have put forth. It is possible that without the "wonks" available to state or federal legislators, the city and county representatives will require a much greater level of personal understanding when addressing complex issues like those related to the successful implementation of information technology. In such a scenario, strong strategic alignment becomes of existential importance.

In a telling example, a city mayor was interviewed regarding the level of alignment in his own local government. Upon being asked why the city had not implemented a service that is widely common in other communities and even had a parallel in other areas of the same government, he could only answer that he did not know (Reynolds 2012). It had not been conceived as part of the strategic plan of the city council or the city manager. While there could be several explanations for this, it may be a strong indicator that the IT function of the city is not particularly well aligned with the overall goals as set by the mayor and council.

A potential disconnect between an organization's chief administrative officer (CAO) and their chief information officer (or designated senior technology professional) can precede or even lead to many issues in regards to proper strategic alignment. The CEO/CAO and their top management teams often control the resources to accomplish objectives deemed important by the organization and the clientele it serves. Often, the upper echelon of management will view information technology in a different manner than the senior information technology professional, causing difficulty for the chief information officer (CIO) in his or her efforts to efficiently carry out or support the objectives of other organizational teams. Occasionally these phenomena will manifest directly in the hierarchy of an organization, but often, there is a strong perceptual indication between the CEO and the CIO as to whether IT strategic alignment exists and causes for the lack thereof.

The size of an organization can also contribute to issues in aligning IT and the strategic needs of the organization. Small and rural localities may face challenges that do not exist in larger and more urban communities. As noted previously, IT investment can be extremely costly and most small governments have limited resources, due to smaller tax bases, to share among numerous priorities. Resource scarcity can force organizational decisions that are not necessarily aligned with IT but may be perfectly logical in regards to budget, personnel, or other concerns. Indeed, the public might play a critical role in this particular issue. Election-aware politicians may fully understand the benefits of the strategic investment in information technology but still decide to purchase new police cruisers for the fiscal year. While resource scarcity is certainly an issue in the private sector, the electoral process adds additional complexity in the public sector.

The ability to acquire adequately trained staff may be an insurmountable problem for some organizations. Location can be a significant criterion. Potential employees with highly attractive skillsets can often find careers in larger urban areas that are more lucrative than those offered in smaller cities. Other amenities found in bigger cities can also sway a candidate's decision. Entertainment, schools, and health services are all facets that may challenge a small city in recruiting critical staff. The issue, of course, is not simply limited to IT professionals.

Developing employees from within the organization carries its own burdens. Training can be costly in terms of real dollars when purchased commercially. Even self-paced training can utilize precious work hours that are difficult to budget in thinly spread small staffs. Given the cost and the potential flight by a newly trained staff person, organizations have to spend valuable time in determining who may or may not be trained. This might involve an ad hoc selection process or a more formalized staff development program. Training agreements that require a certain amount of time within an organization after training may ameliorate some concerns but could prove ultimately distasteful to the more mobile candidates.

More recently, there have been disruptive events that may better illustrate the nature and quality of strategic alignment of information technology within an organization. These are not dispositive simply in their existence since all entities, public or private, will have to react to them. However, how they are incorporated into the planning of an agency may well suggest the shape of strategic alignment and the interaction between the top management and senior technology leadership.

The use of free and open source software has been of interest to many organizations over the last few years. The numerous distributions of the popular Linux server software and projects like OpenOffice/LibreOffice have entered the mainstream where they once were of interest to technical hobbyists. Wholesale endeavors to incorporate free and open source software (F/OSS) have been made by some governments. Munich, Germany, is a well-known example. While not new within information technology, business managers have become more interested in it as a strategic effort. The lack of cost involved in the initial implementation of F/OSS makes it attractive to those that watch the bottom line of an agency's accounts. Alternately, it might be of interest to IT leadership due to the ability to avoid vendor lock-in and hardware agnosticism. The way that F/OSS is accounted for in an agency, the projects for which it is selected as a solution, and the method in which it is proposed and defended to the organization may well indicate the strategic positioning of IT within an organization.

Another growing concern is information security. Recent data breaches for popular retail outlets like Target and Home Depot have made the public much more aware of the data that organizations may keep on their networks and servers. While not to the scale of commercial giants, much of the same information may be kept by government IT resources, as electronic records replace paper and electronic payments become the norm. While current best practices suggest that the information security function should be separated from the IT function due to a basic conflict of interest of security versus efficiency, it is unlikely that many local governments, more particularly smaller ones, would have the resources to manage such a division. Typically, the duty

for information security will fall on the IT function. The structure and importance placed upon information security may strongly indicate the level of strategic alignment within the organization being considered.

Finally, outsourcing of critical IT functions must be considered in regards to strategic alignment. While not a completely new phenomenon, the wholesale dependence on third-party vendors as service providers represented by the outsourcing model is worthy of study. As with other strategic priorities, an agency will have to determine those resources that are best kept in house versus those that are more reasonably outsourced. Every decision is a comparison of the real dollars needed to enter into an agreement with a third party relative to the hardware/software/personnel resource cost of keeping an initiative within the organization. This is critical given the recent interest in moving traditionally internal technology initiatives to external abstracted computing resources, commonly called the "cloud." Concepts like platform as a service (PaaS) and software as a service (SaaS) may reduce technical complexity but engender greater concerns when examined through the lens of strategic alignment. Vendors promising low costs and enhanced performance of critical applications may easily sway non-technical leadership. However, recent outages that affected Google and Microsoft suggest that there are still risks (Raphael 2014). Outsourcing may generate unique and complex issues for an organization attempting to align its information technology resources and its strategic planning goals.

Open source utilization, information security management, and outsourcing choices all potentially provide a richer view into the strategic alignment of information technology. This is particularly true for governmental and non-profit entities because

they are not solely concerned with the concept of revenue generation. This is a more difficult concept to map to the public sector. However, the pressures they bring to bear on organizational resources and how IT management works with top organizational management to mitigate them will effectively highlight critical aspects of this research.

Information technology strategic alignment is important for numerous reasons. As already noted, information technology provides the opportunity for a richer and closer interaction between the citizen and the government. However, information technology can be exceedingly costly. Projects can easily run from tens of thousands to millions of dollars. They often are not as successful as they promise. In a time of increasing public scrutiny and fiscal belt tightening, it is incumbent on the government at all levels to strive to ensure that technology is placed properly and utilized efficiently to maximize the chance of the organization meeting its goals. Information technology strategic alignment is a powerful and critical piece of that framework.

Summary of Chapters

Chapter 2 will provide a review of the research literature relevant to this inquiry. This will include the importance of the strategic alignment of information technology generally as well as in regards to smaller public entities. Pertinent research regarding the structural and perceptual factors indicating the level of strategic alignment within organizations will be summarized. Finally, research related to specific information technology initiatives that may serve as indications of actual strategic alignment will be considered.

Chapter 3 will offer a detailed view of the research design underlying this inquiry. This will include the process by which organizations of interest will be selected.

Following that, the methods of determining the senior information technology leadership for each organization will be discussed. The construction of the survey instrument will be described as well as the key datum to be included. Finally, the intended methods of studying the returned studies will be addressed in the chapter.

Chapter 4 will include the results of all tests and measures discussed in Chapter 3. This will include the demographic information that describes the data set of returned surveys. Significant data groupings based upon city size, IT staff size, IT budget, and proximity to major metropolitan areas will be compared. Likert scales that indicate perceptual attitudes about strategic alignment will be analyzed. Finally, exemplar initiatives of project management, outsourcing, information security management, and open source software adoption will be analyzed for comparison to the perceptual indicators.

Chapter 5 will interpret the research findings presented in Chapter 4. Findings will be considered in light of the existent research in this area. Corroborations and differences with the current literature will be highlighted. The analysis of findings will be predicated on the importance of strategic alignment to organizational performance as established in Chapter 2. Limitations of the research will be considered. Specifically, attention will focus on filters placed upon the original data frame and response rate. The potential for further research, especially where this inquiry suggests differences from the current literature, will form a robust platform for future research. Contributions to the field of public administration of this research, particularly in regards to the application of information technology by practitioners, will be emphasized.

Chapter II

LITERATURE REVIEW

Importance of the Strategic Alignment of Information Technology

Considerable time in current research has been dedicated to the concepts of strategic alignment (Feeny et al., 1992; Reich and Benbasat 2000). Strategic alignment can be broadly defined as the congruence between organizational resources and goals though the literature is often less precise terminology (Avison et al., 2004). A number of domains can be considered when studying strategic alignment. Grembergen (2004, 8) highlights: scope, distinctive competencies, governance, administrative architectures, processes, and skills. While Grembergen is oriented primarily towards organizations within the private sector, most, if not all, perspectives considered could be applied to organizations within the public sector. A specific theme of these research endeavors has been the study of alignment in regards to information technology within the articulated strategic goals of an organization (Avison 2004, 225; Grembergen 2004). Feeny et al. (1992) suggests that IT strategic alignment may simply be seen as an agreement between IT/IS plans and the strategic business plans of an organization. Naturally, this would argue for a clear communication channel between IT and organizational leadership.

Chan et al. (1997) and others suggest IT strategic alignment is a major concern for CIOs across many organizational types. However, as noted above, it can be difficult to define with a precision. Chan goes on to argue that, based on previous research, there are

generalizable models of IS/IT strategic alignment that can be useful when considering

organizations of differing resource needs and expected outputs. This literature is

primarily concerned with large organizations. Campbell et al. (2005) cautions that

strategic alignment can be attenuated when there is a great distance between the

executives doing strategic planning and the lower level personnel that are carrying out the

objectives resultant from that planning. This vertical aspect is particularly important to

the study of smaller private and public organizations when one considers that the senior

IT professional, if one is in place, may not be part of the top management team and may,

in fact, be quite distant from the executive suite.

Henderson and Venkatraman (1993) argue that organizations may experience

limited returns on their information technology investments unless there is a proper

alignment between business and technology strategies. Far worse are the failed attempts

to implement technological change. The most obvious of such would be a major, if not

catastrophic, expenditure on information technology that could ultimately result in the

organization's collapse. Further, they argue that the benefit of technology to an

organization is not so much through a specific piece of hardware or software but rather

through its careful exploitation in meeting organizational goals (Henderson and

Venkatraman 1993). As Tallon and Pinsonneault (2011) go on to suggest, there is a

potential payoff for technology investments when there exists strong alignment between

the business and IT executive. Additionally, Tallon and Pinsonneault consider the

importance of information technology strategic alignment and its implications for

organizational agility in lieu of traditional measures. Of particular concern to both public

and private sector organizations is the ability to adapt to a volatile environment that includes a rather informed and demanding consumer (2011, 464).

The most common models for studying the strategic alignment of information technology within a firm tend to coalesce around two lines of inquiry (Reich and Benbasat 2000). The first tends to focus more on the structural arrangement of information technology within the organization to indicate the level of strategic alignment. A specific example of this would be the placement and reporting structure for an organization's top technology executive. While not solely predictive, the positioning of the IT leader may suggest the level of alignment (Banker et al., 2011). The second research theme involves social dynamics within an organization that may influence and serve as indicators to the level of alignment within the entity being considered. Concepts of trust and shared understanding between the CIO and the top management team may be important factors related to alignment (Johnson and Lederer 2010). The existence of trust and shared or mutual understanding would also suggest the potential, if not actual existence, of alignment (Preston and Karahanna 2009; Johnson and Lederer 2010).

The interest in the strategic alignment of information technology is largely driven by the pressures arising from broad technological changes propelling the information technology function of many organizations from back office data centers to the front line as a strategic partner (Reich and Nelson 2003). This demands a shift from an historic concept of information technology management to governance. As Grembergen (2004, 4) notes, the difference is that information technology management focuses on the provision of commodity services whereas governance focuses on how technology is shaped, aligned and controlled to meet organizational strategic objectives. Historically,

information technology was seen as needing to be managed heavily for cost, and return on investment was calculated in monies saved and efficiencies gained. It was rarely apparent to the citizen consumer when technology underwent innovation. Critically, strategic alignment of information technology within organizations is a research area germane to assisting organizations in the successful positioning of IT to best support an overall strategic plan (Luftman 2003; Luftman 2004; Preston and Karahanna 2009; Tallon and Pinsonneault 2011). This is in stark contrast to earlier utility-like perspectives about information technology being largely support-focused. Unfortunately, it is unlikely that history will provide much to inform next-generation organizations regarding the proper use of information technology. The pace of change is simply too fast for traditional management techniques of previous eras.

Strategic Alignment in the Public Sector

It should be noted that there is an understanding in the literature that public and private sector organizations do have their differences. Bretschneider (1990) finds this in comparisons between public and private information management system strategies. However, the primary differences lead to an adaption of standard (private sector) management practices rather than wholly new paradigms (Bretschneider 1990, 543). Similarly, Cats-Baril and Thompson (1995) consider differences in the two sectors to approaches focused on information technology project management. While accepting that there are differences, they still hold that private sector practices can guide and inform public sector policy. It would seem that environmental differences notwithstanding, much of the research related to strategic alignment should be applicable to the public sector.

While there is considerable research about information technology and strategic alignment in the private sector, the consideration of such is lacking in the public sector (Dunleavy et al., 2006, 469). Pollitt (2010), akin to Dunleavy, suggests that the research field within public administration is arid at best. As he states, "Indeed in many PA books, the term [technology] does not even appear in the index…" (32). Technology is deeply enmeshed in organizational strategy within many private sector entities. However, whether that same integration exists in the public sector remains unclear. This may be particularly true among smaller entities where the IT function is small, under-resourced, or relatively immature.

Ring and Perry (1985) explore the differences and challenges of strategic management in the public and private sectors. They find the manner in which management policy is developed and implemented in the two spheres is different (277). Strategic management policy in the public sphere is never free of the political and administrative dichotomy. Those creating policy are not the same as those that will carry it out, and there is an inherent risk of misalignment that is not precisely mirrored in most private sector organizations. The Civil Service reform and other similar initiatives may create challenges to strategic alignment. Regarding the removal of the civil service worker from the political spoils system, Ring and Perry say, "In private sector organizations, however, dependencies of this sort are the rule rather than the exception" (1985, 277). Finally, they suggest that public organizations are much more open to the public than are those in the private sector. Constituents have many more ways to interact with public agency managers and strategists than do the consumers of private sector goods. Private sector management teams and boards have the luxury of ignoring the

input of the individual. There is an important distinction in this case with the public sector through the election process (Ring and Perry 1985).

Early work in regards to strategic planning in public entities could be seen as a precursor to the more recent inquiries regarding the strategic alignment of information technology. Planning is an important aspect to the entire strategic orientation of most organizations. This is as true of public entities as it is of those in the private sector. As Bryson (1988) further suggests, planning is critical to the ongoing viability and relevance of governments, non-governmental organizations, and other public organizations. Bryson further argues that without properly executed planning, organizations will have a difficult time in meeting the challenges as they move forward to serve their clients. Given the noted rapidity of change surrounding information technology, Bryson's warning is of particular importance. As he further suggests, "Strategic planning for public and non-profit organizations is important and will probably become part of the standard repertoire of public and non-profit planners" (81).

While both Ring and Perry (1985) and Bryson (1988) suggest difficulties in applying traditionally private sector activities like strategic management and strategic planning to the public sector, both go on to argue that there is benefit to the public sector. Strategic management, and the eventual development of strategic alignment for information technology, may be better viewed in the context of the effort of the organization under scrutiny. A strategic management intervention to correct customer service problems with the front counter of a retail store may often closely mimic the same effort to improve the customer service issues at the local county tag or license office. However, a project to improve the number of acceptable widgets coming off a factory

line would likely bear little resemblance to many governmental management initiatives. In interpreting their own and earlier research, Ring and Perry argue that varying contexts, outside of just public versus private, will call for different approaches to strategic management (1985, 284). Bryson suggests that the application of strategic planning processes to the public sector may simply be a matter of organizational maturity, but that even the simplest of attempts may generate some benefit to the organization to include: keeping management teams focused, prioritize action by the organization, and successful implementation (1988, 81).

Holley et al. (2004), in considering strategic information systems planning among county governments, found that many were not doing so. While IT planning is not an exhaustive indicator of alignment, it can be worrisome if not present. Rather than seeing information technology as a strategic partner, county administrators tended to view the function as administrative and operational. While other literature suggests that this corresponds with a common viewpoint that technology is a cost center that should be controlled (Banker et al., 2011), Holley et al. goes on to contend that this lack of planning and alignment will greatly impede the county government from most effectively meeting its duties to its constituents (2004, 106).

Merwin et al. (2005) suggests similar issues in examining the IT efforts of several local governments in Georgia. In their study of IT within local governmental entities, the authors found several without an apparent technology function. Additionally, where the IT function was present, it often did not have a place at the strategic planning table with the top management of the organization. This gulf, obviously, would not bode well for the likelihood of finding a strong and integrated alignment between organizational goals

and technology planning and strategy. Similar to Holley et al. (2004), Merwin et al. suggests that the lack of IT alignment, more specifically planning and coordination, disrupts the local government's ability to serve its citizens in the most effective manner possible (2005, 3).

Cats-Baril and Thompson (1995) contend that public sector entities are under increasing scrutiny in how public funds are expensed. In addition, public expectations are being shaped by the public sector. In their work regarding information technology projects, they highlight several steps. Tellingly, the first step of their proposed plan is, "Evaluate whether or not the project that is being proposed is aligned with the mission and objectives of the organization" (563). Per their argument, a properly-aligned project is easier to initiate and can expect better top management support. Doing so may go a long way to mitigating the chance that the CIO or organizational executive will have to be in the unfortunate position of explaining a lackluster project and the money that disappeared into it (Cats-Baril and Thompson 1995, 563).

As noted above, the research on strategic alignment is often solely focused on the private sector. It is important to note that some effort has been made to differentiate it from the public sector and the unique issues of technology and alignment within public entities. Among five dimensions, Bretschneider (1990) found that the requirements for public management information systems differed from those in the private area. Most notably, the information technology leaders for public entities most often were placed lower in the organization's management structure than their peers in the private sector. This could have implications for alignment, as it might signal organizational maturity (Luftman 2004), orientation (Banker et al., 2011), or engagement (Preston and Karahanna

2009). Additionally, the management of public information systems necessitated proficiency by the leadership for the intricacies of governmental bureaucracy and agency interdependence. Private sector information systems managers viewed initiatives more along economic factors as opposed to feasibility concerns and had to worry less about coordination with external organizations. Again, while differences do exist, research still suggests that theories based in the private sector have some general applicability to the public sector.

Traditionally, IT within the public sector has not been seen as a transformative agent. As previously noted, IT was often relegated to an operational functionality. However, this view became challenged in the late 1990s with the advent of the Internet and software applications based around it (Beaumaster 2002; Dunleavy et al., 2006). Email, the web, and like technologies have dramatically decreased the distance between the government and those governed. The Amazons and Googles of the world have created an appetite and expectation for on-demand services and information in a way not previously seen by public administrators (Beaumaster 2002; Dunleavy et al., 2006). Pollitt (2010) goes further by suggesting that nearly every facet of public administration has been or likely will be changed by the rapid evolution of technology in the public sector. Basic ideas like time and space, as they apply to the delivery of public services, take on new meanings and require new management techniques to account for them.

The potential transformative benefit to local government of properly aligned IT strategy is great, as Tat-Kei Ho comments (2006). Technology promises to deliver government information and services more quickly and directly to the constituent. However, Tat-Kei Ho goes on to note that organizational barriers and resource scarcity

impede transformative efforts many times. A failure to implement IT properly can often lead to greater inefficiency and frustration for the citizen consumer and challenge the success of any transformative project (Beaumaster 2002).

It is unlikely that the new environment that public administrators are now facing is going to end or slow. If anything, the pace will most likely continue to increase. Local government will become more of a target due to its proximity to the citizen and its management of mundane but critical services. As Beaumaster states, "Today a shift in this approach [technology management] is necessary to enable managers and organizations to meet varied and rapidly changing needs of the future" (2000, 9).

IT Strategic Alignment in Small Organizations.

There is some recognition in the research literature of a need to differentiate between large and small organizations when considering theoretical implications (Hussin et al., 2002; Ortiz de Guinea et al., 2005; Ismail and King 2007). There has been a paucity of research, however, conducted on the importance of information technology strategic alignment for small organizations (Hussin et al., 2002). Despite the lack of research in regards to strategic alignment of information technology in small organizations, the need for the proper use of advanced information technology has been present in the literature. Specific to this work, the use of advanced information technology systems was found to be of importance in the considerations of internal effectiveness by city mayors and managers when surveyed (Stevens 1984). A dimension of internal effectiveness could certainly be seen as related to strategic alignment.

Historically, smaller firms have not been seen to pursue, or even need, a strong alignment between technology and organizational goals. Much of this can be due to a

lack of financial support and sufficiently trained staff (Ortiz de Guinea 2005). However, Hussin et al. (2000) found a correlation between levels of information technology maturity and levels of alignment. The more mature the organization, the more aligned. This suggests that as smaller firms gain experience with technology and its proper implementation, the level of alignment with organizational goals should also be strengthened (Hussin et al., 2000, 119).

In considering the strategic plans of local governments, Holden et al. (2003) found a significant lack of strategic IT planning in local governments. This was found to be somewhat moderated as the size of the locality increased. This lack of apparent planning and consequently strategic alignment at the local government level is addressed in the research. Per Holden et al., local governments cited the pace of technological change, the lack of resources such as money or expertise, and top management not prioritizing the strategic implementation of information technology. Small local governments may not be positioned to benefit from strategic alignment due to these factors. This is in contrast to potential benefits to be seen by small private sector organizations per Hussin et al. (2000).

Moon (2002) corroborates the findings by Holden in regards to IT planning and technological adoption when the size of the organization is considered. The larger the size, the more likely there is to be a presence of strategic planning and IT adoption. However, in considering the type of municipality, Moon found a considerable difference in technological adoption with those governments being led by a city manager and council to be more likely to be innovative technologically than those led by a mayor and council model. However, the rate of comprehensive strategic plans between both models

was less than 10% of respondents in each case (Moon 2002). The lack of a comprehensive strategic plan would strongly suggest that strategic alignment is not a priority for the organization.

Organizational Indicators of Strategic Alignment

A number of research articles identify key indicators of information strategic alignment within an organization. The most visible of these would be the placement of the senior information technology officer within the formal reporting structure of the organization. Placement within the leadership hierarchy could well be a sign of alignment (Luftman 2003; Banker et al., 2011). Typically, the CIO (or top-level information technology leader in an organization) will report to the CEO or CFO. Banker et al. (2011) goes on to suggest that such a reporting structure may demonstrate a rather strong indication as to whether the organization's leadership team sees IT as a strategic asset or more a utility to be cost-controlled. This is not a diminution of the importance of the CIO but rather indicative of the organizational orientation. Complementary work by Bretschneider (1990) also indicated that public entities do tend to place their information technology leaders at a lower rung within the hierarchy. This can have significant impact on projects and create an environment that Cats-Baril and Thompson (1995) suggest is strewn with IT projects that are starkly lacking in benefit to the agency or the public it serves.

Regardless of where the CIO reports in an organization, the literature indicates that the formal inclusion of the CIO in the top organizational team can indicate a strong likelihood, or the precursors, of strategic alignment within the organization (Preston and Karahanna 2009). They also found that the inclusion of the CIO, in what they term

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"structural systems of knowing," was highly correlated with developing a shared understanding between the top management team and the CIO. Essentially, this describes an environment where the CIO understands the requirements of the organization and the organization understands the ability of the IT function. A subsidiary aspect of this environment is that the CIO is provided with an opportunity to educate peer leaders on what IT can and cannot do effectively with regularity rather than on a sporadic ad hoc basis. Conversely, their research indicated that there was little correlation between the potential for strategic alignment and "social systems of knowing." These systems primarily encompassed informal interactions between the CIO and top organizational leadership. IT leaders found such interactions to be "nice" but ultimately less useful than having a seat at regular executive team meetings.

Luftman (2003, 2004) describes several characteristics that can also serve as indicators of an organization's level of information technology strategic alignment. One key aspect of this is the way an organization approaches strategic planning for the entire organization, as opposed to just IT and the role the CIO plays in that process. The lack of inclusion of the CIO in the formal strategic planning process of the organization may suggest a lack of vision concerning IT as an important component in achieving the goals of the entity (Merwin et al., 2005) or a lack of maturity in the development of an overall IT governance structure (Luftman 2003). The inclusion of the IT leader in the formal strategic planning function of an organization can be a strong indicator of alignment.

Similarly, how an organization handles the budgeting for information technology can be an indicator of strategic alignment. At the lowest level, an agency may only see IT as a cost center (Luftman 2003; Luftman 2004). In such a scenario, the CIO is simply

a manager who works to contain and control IT spending. At the other end of the spectrum, the CIO is fully engaged in the budgeting process, and the organization understands that IT is an investment and potential profit center. This again also reflects Preston and Karahanna's (2009) work on the CIO's ability to both learn and influence the top management team by formal inclusion in the budgetary process. Inclusion in the budgetary planning function would suggest an orientation towards alignment.

While a fair amount of the research literature is devoted to formal structure and roles for IT leadership in considering the level of strategic alignment, there is indication that less formal criteria can be of use in evaluation. Luftman (2003) and Preston and Karahanna (2009) suggest that trust between the top management team and the CIO can be a precursor and/or indicator of strategic alignment. The level of understanding between the CIO and the top management is also indicative. As previously highlighted, this can create an environment that is conducive to each party better understanding the needs and capabilities of the other. Other criteria can also be measured that are not directly a result of formal structure. Whether or not the top management team regularly consults with the IT leader can signal a level of alignment within the entity. This factor differentiates whether IT is seen as a full partner in the ultimate success of the organization.

CEO – CIO Relationship

Of particular importance when considering the strategic alignment of information technology within organizations of any size and any sector, the specific relationship between the CEO and the CIO demands examination. Depending on the size, goals, and environment of the organization, leadership may be located and termed in a variety of

ways with consequences for strategy (Zaccaro and Klimoski 2001, 21). In the private sector, there may be a single CEO, a CEO answerable to a board of directors, or a CEO answerable to a board of directors that manages a strong executive team. In public sector organizations, there may be a CEO that is representative of political leadership (such as a mayor), a chief administrative officer (such as a city manager), and various agency or department heads. The CIO may or may not be identified, in either type of organization, as part of the top management team. Indeed, the title may not exist and the senior technology professional may be several layers down in the organization's hierarchy. All the permutations can make ensuring that strategic alignment exists difficult to ascertain or evaluate.

In researching the opinions of sitting CIOs, Reich and Nelson (2003) found that most believed the rapid pace of change of the work environment in regards to IT will demand a strengthened relationship between the CEO and CIO. However, earlier research by Feeny et al. (1992) suggests that such strong relationships tend to be possible only where the CEO and CIO have a shared vision. While the vision may vary greatly across organizations, the need for the CEO and CIO to agree is borne out by their inquiry. A CEO focused on using IT to cut costs will not find the CIO with a vision to transform to be in congruence. As the CEO is the chief implementer of organizational strategy, the dissonance in this example would make strategic alignment difficult if not impossible. Feeny et al. goes on to suggest that the CEO/CIO relationship may be improved by the CEO's personal IT experience (particularly successful IT projects), relevance of IT to the organization's purpose, and the level of change required by the organization (1992, 445).

In considering the mutual understanding between the CEO and CIO, Johnson and Lederer (2010) found considerable proof that mutual understanding does improve strategic alignment among several characteristics. This is largely in agreement with research done by Preston and Karahanna (2009) on the concepts of shared understanding within an organization. Shared or mutual understanding may be a discrete factor separable from the actual organizational location of the CIO and the IT function. This particular study also considered whether strategic alignment actually created a benefit to the organization through information systems utilization. The study validates the contention by Feeny et al. (1992) that shared vision between the organization's top management team and the IT function improves alignment and thus benefits the organization's endeavors to meet strategic goals. Of eight dimensions descriptive of strategic alignment (aggressiveness, analysis, internal defensiveness, external defensiveness, futurity, proactiveness, riskiness, and innovativeness), only one was not impacted by mutual understanding (Johnson and Lederer 2010). Riskiness was not seen as benefiting from mutual understanding, but this may be due to CEO unwillingness to share the particulars of a firm's risk strategy. This further corroborates the benefit of strong CEO/CIO communication to strategic alignment development. It is incumbent on the CIO to foster a mutual understanding with the organization's CEO/top management team about the role of IT within the organization and its strategic goals.

Exemplars of Information Technology Strategic Alignment

Within an organization, the measure of IT strategic alignment could be considered in a myriad of ways. For research, certain initiatives will be more profitable in the information gleaned. The four areas selected are drawn from recent literature as issues

on the minds of information technology leadership across many organizations. In examining how these examples are initiated, implemented, and evaluated at completion, the collected data should reveal key insights into the actual level of strategic alignment of an organization outside of the descriptive and perceptual factors discussed above.

Project Management

The projects an organization chooses to pursue can also be an indicator of strategic alignment. IT now plays a central role in the way public services are provided and continues to influence them (Dunleavy et al., 2006; Pollitt 2010). Historic changes have developed to repurpose technological innovations from simply endeavors for efficiency and cost-containment to transformative efforts that can change the entire gamut of interactions between agency and consumer (Tat-Kei Ho 2002). It is not a great leap to assume that the primary goals of any governmental agency and cities in particular, are to serve their constituents as efficiently and effectively as possible. Local governments are particularly mindful of this due to their proximity to the client base. Therefore, it is within reason to assume that information technology projects taken on by small city governments would be orientated towards better constituent engagement if alignment exists. Given a propensity for cost overruns and delays in IT projects regardless of sector (Cats-Baril and Thompson 1995), it is likely that projects focused on enhanced engagement and improved services would be an increasing trend and a factor worth considering in the research.

Outsourcing

A more recent trend to shape the study of strategic alignment of information technology is outsourcing. While the topic has had a presence in the research literature

since the 1970s, the 1980s saw the first of the major IT outsourcing deals like that between Kodak and IBM (Weinert and Meyer 2005). The escalation of demand for IT resources due to the development of Internet and broadband constituent access has made it a relevant topic of inquiry. In fact, the outsourcing of services has been one of the fastest growing topics in regards to government IT management (Wait 2003). Essentially, outsourcing of the IT function within an organization is the decision by an agency to contract out or sell IT services, resources, and personnel to a third-party vendor in lieu of an in-house IT organization (Kerns and Willcocks 2000; Weinert and Meyer 2005).

Weinert and Meyer (2005) argue that IT outsourcing has matured in regards to modern needs for strategic alignment. Firstly, IT outsourcing may be implemented in many different modalities than in prior times. Low communication costs (like Internet-enabled telework) provide the ability for an organization to outsource IT work to not just domestic vendors but potentially anywhere around the globe. Secondly, IT outsourcing is now more complex because the role of technology has matured within the workplace. As noted previously, IT was seen in the past as a discrete unit of the organization. However, modern changes have caused IT to become more cross-functional and a requirement of most, if not all, organizational functions (Weinert and Meyer 2005).

There are several benefits that the outsourcing of IT may offer an organization, whether in the public or private sector. Among these benefits may be reduced cost, greater efficiencies, organizational flexibility, greater expertise, and re-focus on core functions (Cox et al., 2011, 193). Certainly, it is easy to see how these may all be appealing to a small local government. Funding is often limited for projects outside of

the day-to-day operations (Chen and Perry 2003). Often, local agencies may have to serve in multiple roles. Greater flexibility, as provided by prudent outsourcing, can facilitate this need. A critical benefit to the smaller local government is the access that outsourcing provides to professionals with deep skill sets (Chen and Perry 2003). Oftentimes, the expertise is not needed on a regular basis by the organization, or the area simply has no pool of professionals with requisite skills from which to select. In any event, the complexity of IT can make how it is outsourced, if the organization chooses to do so, a thing of careful management consideration (Cox et al., 2011).

The management of outsourcing relationships is often the critical component to their success or failure (Kern and Willcocks 2000; Chen and Perry 2003; Cox et al., 2011). For public organizations, this suggests a three-part dynamic that must be considered when looking at strategic alignment for small public organizations and governments. One aspect would be the CIO (or senior IT professional) with the CEO/CAO of the organization. The strategic requirements for the outsourcing engagement are articulated in this segment. The relationship between the CIO and outsourcing vendor is critical; it is where the delivered benefits of the contract must be managed. The CIO will typically be the person most directly in charge of ensuring that services are meeting the needs of the organization. Finally, the CEO/CAO relationship to the vendor in regards to funding is critical. Continued enactment of the contract requires the vendor and CIO (often working together) to secure further funding for contract extension or expansion. The success or failure of IT outsourcing projects in the public sector is usually directly attributable to the organization's ability to manage the outsourcing project (Chen and Perry 2003, 407; Weinert and Meyer 2005). This likely

will have serious consequences for those organizations that decide to forgo wholly any information technology expertise within the hierarchy. The rise of non-expert solutions, like cloud services, may warrant concern as agencies increase their reliance upon complex technologies without proper in-house IT management skills.

Information Security Placement

Recent data breaches in the commercial world, such as those that hit the national retailers Target and Home Depot in 2013 and 2014, shake consumer confidence in the businesses' ability to protect consumer data (Sharf 2014). This loss of reputation can hinder an organization's performance and may make it liable for audit issues, regulatory repercussions, and legal proceedings. The public sector faces many of the same or greater concerns, with various levels of government possessing, and exposing, constituent PII (personally identifiable information) (Zhao and Zhao 2010). The exposed PII could include information such as full names, addresses, or social security numbers, or other sensitive data. Particularly at the local government level, health or educational records could be exposed that would violate specific provisions of such laws like HIPAA (Health Insurance Portability and Privacy Act) or FERPA (Family Educational Rights and Privacy Act).

However, in a 2011 report, it was estimated that only 40% of small organizations (including both private and public sector) maintained a separate information security staff that was external to the organization's IT function ("IT Security Staffing Level Breaks Downward Trend" 2011). Additionally, information security staffing was only 2.7% of total IT staffing for public sector entities. While this is in line with much of the private sector, actual staffing for information security professionals per organizational employee

was much lower at a ratio of 1 per 1368 employees. This strongly suggests that the smaller city governments would be highly unlikely to support a robust and hierarchically separate information security function despite that being the recommended best practice (Whitman and Mattord 2013). This is in large part due to the natural conflict of interests between the information technology function and the information security function. IT is primarily focused on meetings the goals of an organization in the most efficient way possible. Information security policies and procedures, by their nature, tend to slow and hamper that goal of IT. Given a changed technology landscape, strategic alignment must account for the competing issues of information technology leadership and information security demands.

Given the necessity of information security in modern times, the literature argues for an alignment of not only organizational and IT strategies but also ensuring an alignment of information security strategy as well (McFadzean, Ezingeard, and Birchall 2007). Assuming that small city governments will retain small IT staffs and subsequently charge the same with information security, there may be information to be drawn regarding information technology strategic alignment in these particular entities. Per an examination of small businesses, Gupta and Hammond found that less than 60% of small firms employed any particular component of a spectrum of information security practices such as information security policies, acceptable use policies, anti-virus, firewalls, and power-surge protection (2005). The lack of such could indicate a poorly aligned comprehensive IT/information security strategy within the organization. Despite the current environment, IT leadership (or information security leadership in rare instances)

may be ineffective in obtaining appropriate resources required to secure constituent data and other information resources.

F/LOSS Adoption

Free/Libre open source software solutions (F/LOSS) has generated a great deal of interest in both the private and public sectors (Ven and Verelest 2012; Bouras, Kokkinos, and Tseliou 2013). As noted in the introduction to this paper, solutions like the Linux operating system and free open source competitors to Microsoft Office have garnered attention outside just the IT shops of organizations. While there have been few wholesale adoptions by governmental organizations, several cases have made the news as successful. One of the more well-known is the city of Munich, Germany, which announced it had successfully completed its conversion to open source with an annual savings of over $16 million (Essers 2013). In a telling exchange between Microsoft founder, Bill Gates, and Munich's mayor, Christian Ude, the attitude some have about switching to F/LOSS solutions is well articulated:

> Gates: "Why are you doing this?" Ude, remarking aside that he has trouble speaking in English, punctuated "To gain freedom!" Gates had to think about this for a bit, Ude said, but then asked: "Freedom? From what?" Ude: "From you!" (Hillenius 2013, para. 59)

Several studies strongly argue that the successful adoption of F/LOSS by an organization is associated with the ability of the organization to adapt to change (Ngeleza, Mkhize, and Lubbe 2009; Spagnoletti 2011; Rossi et al., 2012). Tallon and Pinsonneault then associate organizational agility, the ability to respond to change, with effective strategic alignment (2011). For the purpose of this inquiry, the successful

adoption of F/LOSS by an organization should be a strong indicator of the strategic alignment of IT. This is particularly true given the necessity of "championship" for success (Rossi et al., 2012). It follows that the champion must be effective in negotiating both the technology and administrative processes within the organization. Again, this requires communication, and the sharing of knowledge would be a signal of proper strategic alignment.

Ven and Verelest (2012) suggest in their study of why organizations choose to adopt F/LOSS several criteria that are specific to small organizations. Among these are:

- Software cost

- Hardware cost

- Switching cost

- Reliability

- Trialability

- OSS attitudes

- Source code availability

- Innovativeness

- Boundary spanners (organizational members with external OSS experience)

- External support

- Vendor lock-in

While many of the same criteria were important to all organizations, software cost, reliability, OSS attitudes, and external support were most critical to small organizations. Additionally, OSS attitudes, innovativeness, and vendor lock-in were more important to smaller entities.

F/LOSS adoption is often a bottom-up process (Ven and Verelest 2012), but examples of top-down implementations also exist (Ngeleza, Mkhize, and Lubbe 2009). It may drive change within an organization, or it may be the result of change in response to either external or internal factors (Spagnoletti 2011). Again, this process and the agility of the organization can have direct impact upon its performance and ultimately factor critically in the strategic planning and alignment of IT (Tallon and Pinsonneault 2011). Examining the adoption of F/LOSS and the resultant success or failures should provide valuable perspective on strategic alignment in the organizations of interest. Important criteria related to this inquiry would be reasons for adoption, championship, OSS attitudes, and boundary spanners.

While information technology strategic alignment has a long history in the research literature, it has largely been focused on the private sector. This makes logical sense given the private sector's focus on profitability and investment returns for shareholders juxtaposed with the considerable cost of technology. However, the changes over the last two decades have engendered a growing interest in the topic within the public sector. While certainly not sharing the exact same goals, public entities are expected to work to be efficient and provide the highest level of client service as possible. The literature clearly indicates that information technology must be properly aligned with the goals of the organization. It would be easy to exclude smaller organizations from such expectations; however, the research suggests that even small to medium-sized organizations can experience a positive benefit when they evince a high level of alignment. Given this paper's specific focus on small local governments and their

proximity to the citizen, the research strongly indicates a need to investigate the phenomenon further.

Chapter 3 will discuss the exact methodology that will be implemented to examine the issues raised in Chapter 2. The discussion will include the specific research questions and hypotheses centered on the strategic alignment of information technology that will be tested. The construction of a survey that incorporates demographic data regarding the organization, Likert-like scales to determine IT leader perceptions about indicators of alignment, as well as opened-ended questions regarding real world examples will be described. The construction and rationale of the list of cities to be incorporated in the study will be explained. Finally, the means of analyzing and comparing the data collected will be discussed.

Chapter III

METHODOLOGY

The intent of this study was to investigate the factors influencing IT leadership's

perceptions of information strategic alignment in small city governments. Secondarily,

observations of actual alignment were considered. This chapter will detail the research

design to be followed in answering the specific research questions as presented. The

focus of study was the senior information technology manager within the organizations

meeting the selection criteria discussed in this chapter. A process was identified to

account for organizations that do not have a formally identified technology leader. This

research was largely exploratory in nature and intended to provide groundwork for future

study in this critical area for organizations.

Participants

  Identification of Qualifying Cities

For this study, small city governments were defined as those having populations

between 10,000 and 50,000 residents. Moon (2002) suggests this divide is the point that

technology adoption and planning starts to appear slow or lacking. It is assumed that

those city governments with populations beneath the lower criterion would more likely be

found to have no formal technology function. If existent, the IT function would be

minimal and may simply be a liaison for outsourced processes (e.g., payroll, website,

desktop support). Cities above the upper threshold would likely have greater resources to

devote to the deployment and utilization of information

technology. As indicated by the literature, organizations with the resources and maturity in the IT function tend to demonstrate a significant level of strategic alignment (Hussein et al., 2002; Ortiz et al., 2005)

According to the United States (U.S.) Census Bureau's 2010 census (U.S. Census Bureau n.d.), there were 2264 cities and towns in the United States that met the criteria for selection. However, for manageability, this research focused only on a portion of that number. The states included and qualifying cities are found in summary in Table 1. Baruch and Holtom (2008) suggest electronic surveys are more accepted now with a better response rate than traditional paper surveys. However, those surveys assessing the thoughts of organizational leadership or representation tend to achieve only a 35-40% response rate. If their research holds true, this inquiry, with the geographic limitation, was expected to receive roughly 181 responses. A full list of qualifying cities to be surveyed are found in Appendix A.

Table 1: Qualifying Cities

State	Qualifying Cities	State	Qualifying Cities
Alabama	51	Missouri	64
Arkansas	30	North Carolina	66
Florida	110	Ohio	158
Georgia	62	Oklahoma	35
Illinois	190	Pennsylvania	59
Indiana	61	South Carolina	30
Kansas	29	Tennessee	44
Kentucky	33	Texas	159
Louisiana	27	Virginia	27
Maryland	17	West Virginia	13
Mississippi	38		
Total 1265			

Unlike Merwin et al. (2003), this study did not exclude those cities within close proximity to large metropolitan areas. There was potential that communities within close

proximity to very large metropolitan areas would be unlike those cities of similar size found in rural parts of the country. However, including these communities as part of the research provided interesting and possibly revealing information. The reasons for this are numerous. Economically, they are generally more affluent than the more rural areas. Many are simply bedroom communities for those that work in the larger cities, and may not show the same organizational cohesiveness as other localities. Information technology professionals are in greater supply, and the populace has greater access to computer and network resources. Including small cities in close proximity to large metropolitan areas also provided additional avenues of analysis in comparison.

Identifying the Senior Information Technology Leader

The list of qualifying cities was then used to identify the senior IT leader in each organization. The information in various resources like state municipal associations was consulted. Where this data was insufficient for identification, city websites were consulted to verify or determine contact information. As a last resort, phone contact with the qualifying city was made to identify the correct employee.

If a senior IT leader could not be identified, the chief administrative officer's contact information was collected. The chief administrative officer was then contacted and asked to forward the survey on to whomever serves as the IT designate within the city's staff.

Research Questions and Hypotheses.

The research questions that this inquiry addressed in regards to small city governments were:

1. Does IT leadership perceive the IT function to be strategically aligned within the organization?

2. What demographic and structural aspects of an organization most influence the perception of strategic alignment?

3. Do IT leaders in cities near metropolitan areas perceive more strategic alignment of IT than those in more rural locations?

4. Is there a positive relationship between the perception of strategic alignment by IT leadership and the actual level of alignment as demonstrated by recent significant projects?

Hypotheses

- H_{0A}: IT leadership will not perceive the IT function to be strategically aligned within the organization.

- H_{0B}: Independent and structural variables will not significantly explain the IT leader's perception of strategic alignment.

- H_{0C}: IT leaders in cities close to metropolitan areas will not perceive greater strategic alignment within their organizations than those in rural areas.

- H_{0D}: There will be a no correlation between the IT leader's perception of strategic alignment and the level of actual strategic alignment.

- H_{1A}: IT leadership will perceive the IT function to be strategically aligned within the organization.

- H_{1B}: Independent and structural variables will significantly explain the IT leader's perception of strategic alignment.

- H_{1C}: IT leaders in cities close to metropolitan areas will perceive greater strategic alignment within their organizations than those in rural areas.

- H_{1D}: The IT leaders' perception of strategic alignment will be positively correlated with the level of actual strategic alignment.

Survey Construction

Drawn from the research discussed in the literature review, a survey (Appendix B) was constructed to ascertain the level of strategic alignment as perceived by city information technology leaders. The survey included a variety of questions consisting of demographic and structural data as well as perceptual data.

Demographic and Structural Data

Demographic and structural data collected in the survey were central to parts of the analysis done on the returned surveys. Several of the questions require simple responses. Examples would include Questions 1 through 5 and 9 through 12 that covered topics such as city population, information about the IT leader, and budgetary details. While much of this data could be gleaned from other sources, starting the survey with easy to answer questions fell in line with the recommendation to start surveys off with something fairly easy and comfortable to the respondent (McNabb 2013, 154). Questions 6 through 8 addressed certain structural issues that were highlighted by Luftman as well as Preston and Karahanna as to where the senior IT leader is actually placed within the organization. This was critical to questions regarding alignment. Question 7 allowed the respondent to identify if they are in fact part of the organization's top management team. While this would seem to be an easy response, it may not be clearly delineated in their organization and therefore an "UNSURE" option was included. This would be relevant

in regards to the ability of an IT leader to communicate with top management strategically and indicative of alignment. Question 8 was concerned with organizational distance if the IT leader is not a direct report to the CEO. This was reported as the level of displacement between the IT leader and the CEO (e.g., if the CIO reports to the CFO who then reports to the CEO a value of 2 would be reported).

IT Leader Perceptions of Strategic Alignment

The bulk of the survey consisted of perceptual type questions. The 10 Likert-type scale questions gauged the IT leaders' perception of indicators of strategic alignment within the organization as identified in the research. Building on the previous work of others, and in particular for this paper Luftman and Preston and Karahanna, Schlosser et al. (2012) proposes an expansive model for the dimensions of IT alignment. A subset of these focused on the perceptions of the IT leadership are utilized in this portion of the survey. While no one item could be seen as indicative of such, it is likely that a respondent answering largely one direction or another would perceive the presence of alignment or the lack thereof. The items were modified to include only four possible responses (Strongly Disagree, Disagree, Agree, and Strongly Agree) coded 1-4. No neutral option was provided for this part of the survey. Again, given the exploratory nature of this study, it was preferred to require some level of positive or negative response per item.

Exemplars of Actual Alignment

Respondents were asked to consider any significant and recent (within 5 years) initiatives undertaken by the organization. The survey provided for responses around the topics identified in the literature review. The approach to project management, free and

open source software, outsourcing, and information security provided insight into the actual level of alignment within the city. Specifically, data were collected on whether the project was a bottom-up or top-down initiative. Determining whether the initiative was purely predicated on cost-saving rather than enhanced services could also be illuminating. In addition to the impetus behind any identified initiative, the survey attempted to identify if the project was championed internally or externally from the IT function. This can suggest whether IT is seen as a cost center or strategic partner, and departmental autonomy to meet strategic goals may be gauged to determine if IT is seen primarily as a utility.

More specifically, the survey requested that the IT leader identify any outsourcing projects that the organization has undertaken. The survey attempted to identify the primary impetus for the initiative. Simple cost reduction, particularly when driven top-down, could be less a strategic decision than outsourcing technology services to leverage advanced solutions and provide citizens with better services.

If the organization has initiated any formal F/OSS adoption process, the survey requested information on implementation. Respondents indicated whether F/OSS adoption is driven in a bottom-up or top-down manner. Cost again was of concern. Top management's directive to implement F/OSS solutions with minimal communication to IT leadership would likely signal a lack of strategic alignment in the entity. IT leadership implementing F/OSS to gain savings and enhanced services would signal a more strategically aligned IT function. Additionally, the ability of IT to test and evaluate different solutions before implementation suggests a strong ability to communicate with top management.

Lastly, IT leadership was asked to describe the placement and emphasis put upon information security in the organization. Given recent events and issues raised in the current literature, it would be unlikely that an organization has not at least considered their approach to information security. While not exclusive to IT, information security is quite often associated with the IT function. In fact, the existence of a separate information security function could indicate a high level of strategic alignment within the organization. However, if a separate information security function is not in place, there is still potential to demonstrate strategic alignment within the governance structure. Examples of SETA (security education, training, and awareness) being implemented within the organization would be examples of an involved governance structure that should be indicative of strategic alignment.

Implementation of the Survey Instrument

Upon the completion of the construction of the survey instrument, Institutional Review Board (IRB) approval was sought before beginning the survey phase of the inquiry. Given that the participants were all expected to be governmental appointees, IRB approval was necessary but expedited, as these are one of the exempt classes per federal regulations. An IRB protocol exemption report for this study is provided as Appendix C.

Once IRB approval was obtained, the senior IT leaders of each city, as identified by processes outlined previously, were mailed the introductory email as found in Appendix D 1 week prior to the survey opening. A follow up email (Appendix E) was sent on the day of the survey opening. No incentives for participation were planned. Per recommendations by the Valdosta State University IRB guidelines, participants could

choose to answer or not answer any question in the survey and could stop answering at any time. No information collected that can tie the individual respondent to a particular survey.

The survey was hosted through a university-hosted subscription to the Qualtrics online survey service. Respondents were given 8 weeks to complete the survey. Weekly, a notice was sent to those cities not having completed the survey, (see Appendix F). If an adequate response rate (35% of potential responders) was not reached, the survey was extended for additional time. In any event, a final notice to request participation was sent on the closing date of the survey, Appendix G.

After the survey closed, all data was downloaded from the Qualtrics website for use in the analysis as described in the next section.

Analysis

Upon survey close, the data collected was analyzed with the R statistical software package a number of ways to answer the articulated research questions and hypotheses. A caveat to the research is that this survey was based upon a nonprobability sample utilizing volunteer respondents. It provided less ability to generalize about the population due to this limitation.

Descriptive statistics were performed on all data collected. Of particular note were the measures related to demographic and structural data as summarized in Table 2. These calculations were useful in establishing a context for the sample frame as well as being of use in later tests. Specifically, calculations on the Likert scale items to include mean, standard deviation, and range provided for the answer to Research Question 1 and either acceptance or rejection of H_{0A}.

Table 2: Demographic and Structural Data Collected

Measure	Name	Type
City Population	CPop	Ratio
Years Employed	YEmp	Ratio
IT Training	ITTrain	Categorical
Business Training	BTrain	Categorical
Direct Report to CEO	DRep	Categorical
Reporting Levels	RLevel	Interval
Member of the Top Management Team	MTMT	Categorical
IT Employees	ITEmp	Ratio
Current IT Budget as % of Overall Budget	ITBudget	Ratio
Percent of IT outsourced	POut	Ratio
IT is Centralized or Decentralized	ITCent	Categorical

Cronbach's alpha was calculated to determine the internal validity of the 10 Likert-like scales. This assisted in supporting the model for further research. In considering the Likert-like scale data, Kendall's rank correlation coefficient (tau) was considered to look for patterns of correlation among the various responses within the scale. Kendall's tau tends to be more conservative and better suited, particularly for a smaller number of responses, than Spearman's rho (Colwell and Gillett 1982). Given the exploratory nature of this research, it was prudent to be cautious in the data analysis.

Additionally, the various scale points were correlated against the demographic data with the appropriate measures. Pearson's r was calculated for the correlation between the ratio and interval variables identified in Table 2. The categorical (dummy variables) were considered with a point biserial correlation.

The Likert-type scales were then summed up to create an overall score of perceived strategic alignment (OPSA) within the organization (Boone and Boone 2012). Then using multiple regression analysis, this score as the dependent variable was

compared against the various demographic points (independent variables) to determine the factors that are explanatory towards the IT leader's perception of strategic alignment within the organization. Such that:

OPSA=b_0+b_1*CPop+b_2*YEmp+b_3*ITTrain+b_4*BTrain+b_5*DRep+b_6*MTMT+b_7*ITEmp+b_8*ITBudget+b_9*Pout+b_{10}*ITCent

The MRA performed answered Research Question 2 and allowed for the acceptance or rejection of H_{0B}.

Additionally, a *t* test was computed between the mean scores for those cities in close proximity to a large metropolitan area and those in rural areas to determine if there was a difference (Remler and Ryzin 2010). This grouping was generated outside of the survey process. This test answered Research Question 3 and suggested a determination on H_{0C}.

The information collected on the four exemplar areas was considered in a similar way to that in the perceptual Likert-like scale. Utilizing the data returned, an overall score was assessed for actual alignment (OAAS) by summing the alignment-positive survey responses. Generally, yes answers were coded as a 1 and no answers were coded as a 0. This score was then compared to the overall perceptual score for alignment with Kendall's tau to determine if there was a strong correlation between perceived alignment and actual alignment as defined in this study. This addressed Research Question 4 and the acceptability of H_{0D}. To expand the analysis, another multiple regression analysis was computed against the actual alignment score as the dependent variable and the demographic data to determine the contributory factors and to compare with the MRA

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that was performed on the overall perceptual sore. The following was drawn from the earlier MRA:

$$OAAS = b_0 + b_1 \cdot CPop + b_2 \cdot YEmp + b_3 \cdot ITTrain + b_4 \cdot BTrain + b_5 \cdot DRep + b_6 \cdot MTMT + b_7 \cdot ITEmp + b_8 \cdot ITBudget + b_9 \cdot Pout + b_{10} \cdot ITCent$$

Table 3 summarizes the analysis performed on the data collected.

Table 3: Summary of Planned Analyses

Measures	Analyses	Purpose
All measures	Mean, Median, Standard Deviation, Range, Standard Error	Summary of data set and context.
Likert-scale Data	Cronbach's alpha	Internal validity measure of the scales
Likert-scale Data	Kendall's tau	Identify correlations among the scale items.
All data	Pearson's r or point-biserial	Consider correlations between all data points collected.
Likert-scale Data	Summed to OPSA	For use in MRA
OPSA	t test, $\mu = 25$	To accept or not accept H0A and answer research question 1.
OPSA and Demographic and Structural Data	Multiple regression analysis	To accept or not accept H_{0B} and answer research question 2.
OPSA	2-sample t test	To accept or not accept H_{0C} and answer research question 3.
Exemplar data	Summed to OAAS	For use in MRA
OPSA and OAAS	Pearson's r	To accept or not accept H_{0D} and answer research question 4.
OAAS and Demographic/Structural Data	Multiple regression analysis	To further compare the explanatory variables for the OPSA and the OAAS

In Chapter 4, the analysis of the data will be discussed. Findings relevant to the research questions posed by this paper will be answered. Indications for further research will be highlighted. Limitations of the research will also be noted.

Chapter IV

RESULTS

This chapter will analyze the results of the research as described in Chapter 3 of this dissertation. Various descriptive and inferential statistics were calculated on the data collected, and significant findings have been noted for discussion in Chapter 5.

The survey was distributed via email to the cities listed in Appendix A. As noted in Chapter 3, cities with populations between 10,000 and 50,000 were considered. Senior IT leaders were identified in a number of ways but primarily through the city's public website directory. In cases where the senior IT leader for an organization was not clearly identified, other public sources including board minutes, bid documents, and domain name server registrations were consulted. Failing those attempts, the email of the chief administrative officer was utilized with a request to forward the survey on to the senior IT leader within that organization. Potential respondents were contacted in three rounds divided by states. The number of surveys and states covered for each round is summarized in Table 4.

Table 4: Survey Response Data

	Sent	Response	Rate	Opted Out	States
Round 1	529	74	14%	38	AL,AR,FL,GA KY,LA,MS NC,SC,TN,VA
Round 2	511	54	11%	34	IL,IN,KS,MD,MO, OK,TX,WV
Round 3	266	22	8%	15	OH,PA
Total	1306	150	11%	87	

The survey management tool used was Qualtrics as provided for student use by Valdosta State University

Instrument and Data Collected

The survey instrument is replicated in Appendix B and is logically broken into three primary focus areas. The structural section comprises information that better describes the responding city and senior IT leader. Questions include data on population, budget, and organizational structure. Questions from the survey instrument that refer to structural data include Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, and Q10.

The second section of the instrument was concerned with the senior IT leader's perception of strategic alignment within the city organization. This was a 10-item Likert scale and notated as 11a – 11j in Appendix B. Due to the exploratory nature of this inquiry, the Likert scale was presented in the 4 option "forced choice" design. Potential responses included 4 – Strongly Agree, 3 – Agree, 2 – Disagree, and 1 – Strongly Disagree. There was no neutral option provided.

The third section of the instrument attempted to ascertain aspects of demonstrable IT strategic alignment through certain exemplar activities within the organization. These were collected as simple Yes/No questions that were then summed based upon response. This portion of the survey utilized a skip logic progression such that if one exemplar activity did not manifest in the organization then no further questions about that particular activity were presented. These are notated as Q12 – Q15 with subparts.

Finally, several questions (Q16 – Q19) were presented as optional items. When answered, this information was included in the structural data gathered for analysis.

Outside the instrument itself, the data was augmented by the determination of the closest metropolitan area to the responding city. This was done by the investigator utilizing Google Maps and the 2010 Census list of metropolitan statistical areas (MSA). Shortest distance to the closest MSA was then recorded for each responding city.

Reliability and Validity of the Instrument

Excluding the Likert scale included in the survey, the vast majority of the data collected was comprised of background variables that may exert an influence on the phenomena being studied but are not influenced themselves by the phenomena (Vogt 2015). In other words, the senior IT leader's perception of strategic alignment may be influenced, even strongly, by the city's IT budget, but it is highly unlikely that the perception of strategic alignment would influence the monies the city allocates.

In regards to the Likert scale portion of the survey, we can consider some measures of test reliability and validity. The most common measure of test reliability is Cronbach's alpha (Cronbach 1951). In calculating this statistic, it was found that the instrument's alpha for the measure of the senior IT leaders' perception was 0.74. This suggests a moderately strong level of internal consistency within this portion of the survey (Kline 1999). Similarly, Guttmann's Lambda 6 measure of reliability was 0.83. This particular statistic measures the squared multiple correlation of the item to other items but is not popular in modern analysis (Gerrard and Johnson 2015). An independent split half correlation also indicated good reliability with an alpha of 0.82 and a minimum reliability, beta, of 0.69. Full reliability testing can be found in Appendix H.

The validity of an instrument can be more difficult to assess (Remler and Ryzin 2010). There are several forms of validity that may be considered. This portion of the

survey was drawn in large part from similar work done previously (Luftman 2003; Luftman 2004; Preston and Karahanna 2009; Schlosser et al., 2012). Based on this, it may be reasonable to assume it at least minimally meets the requirements of face validity and content validity. Questions of predictive validity are beyond the scope of this particular inquiry. In regards to construct validity there are several tests that can suggest a particular instrument is valid.

The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity are accepted measures for determining the relation between variables (Beavers et al., 2013). Calculating these statistics should suggest whether the instrument demonstrates construct validity. It the case of this study, the KMO for the Likert portion of the survey was found to be 0.76 which is "middling" and verging on "meritorious" utilizing the scale that Kaiser himself created (1974). Additionally, the KMO measure is usually accompanied by the Bartlett's test of sphericity. This test proposes a null hypothesis that the correlation matrix for the instrument considered suggests no or minimal correlations between the associate variables. Bartlett's test for the Likert portion of this research returned a p value of 0.03 and therefore the null hypothesis can be rejected. The ten variables of the Likert scale do indicate correlations. Full reports for the KMO measure of sampling adequacy and Bartlett's test of sphericity can be found in Appendix H.

Finally, it was found that the leader's Likert perception scale was moderately correlated with the examples of actual alignment ($r = .35$, $p < 0.05$). This suggests, along with the split-half test referenced earlier, that the instrument indicates a level of

convergent validity (Campbell and Fiske 1959). Convergent validity is predicated on the instrument's results being related to other similar measures.

Survey Responses

This section will report the descriptive statistics for the individual items that made up the survey. As noted above, there were 150 responses to the survey broken up over three rounds. Of that 150, there were 116 responses that had adequate data to be considered in the analysis. In some cases, there were duplicate entries. These were also removed.

Question 1 was an opportunity for the respondent to self-report the population of their city. The city population mean was 23222.62 ($SD = 11839.5$) and a range of 10,000-53,000 (n = 116). Given that the response cities were selected utilizing the 2010 U.S. Census, some cities did have population growth while others had some decline. Figure 1 highlights the distribution of the responding city populations contrasted with the
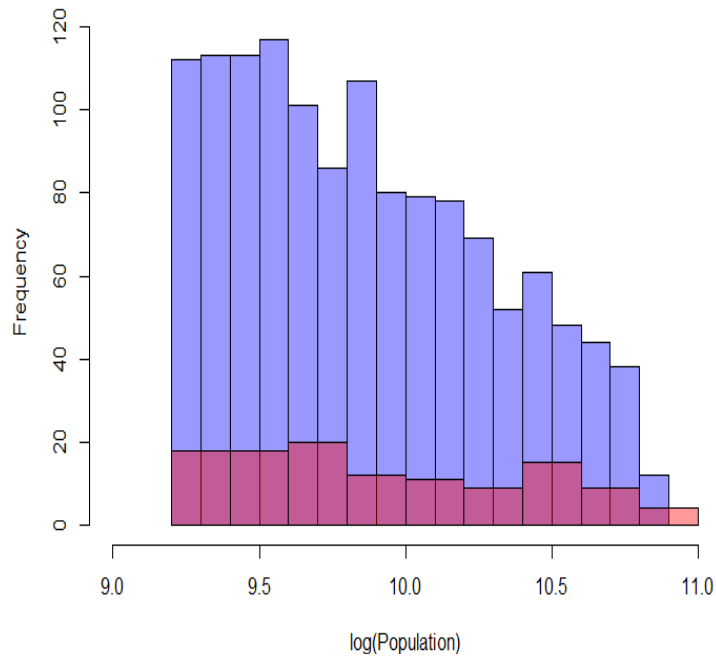

Figure 1: Population of Cities Contacted Versus Responding Cities

distribution of all cities contacted. As the figure indicates, the distributions were quite

similar which suggests a lack of bias in regards to city size and response.

Questions 2 and 3 are dichotomous variables that serve to represent aspects of the

city's organizational model and maturity in regards to the information technology

function. Question 2 (n = 112) is concerned with the presence of an information

technology strategic plan within the city's governance policies. Question 3 (n = 114) had

the respondent record if they were a direct report to the CEO/CAO of the organization.

The summaries of these Yes/No questions are illustrated below in Figures 2 and 3.
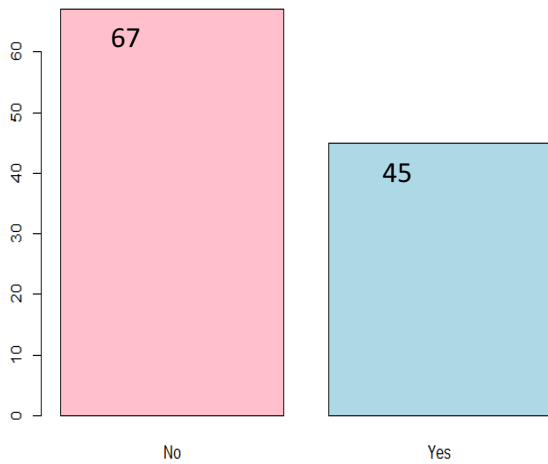
Figure 2: City has IT Strategic Plan
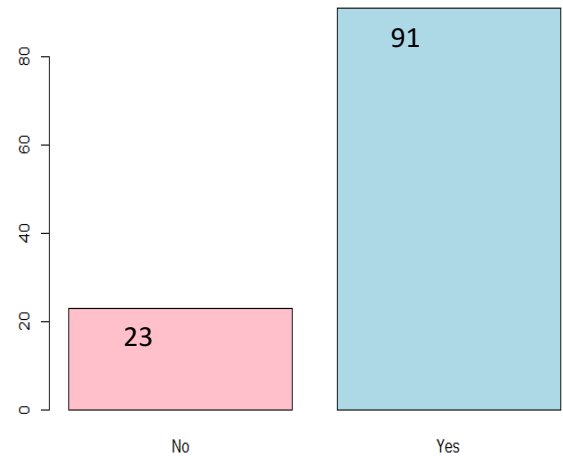
Figure 3: IT Leader is CEO Direct Report

Question 4 (n = 106) attempted to assess if the respondent was part of the

organization's top management team (TMT). This would be analogous to a Mayor's

Cabinet or administrative/executive team. The question provided for the answer to be

Yes, No, or Unsure. This is related to Question 2 but assumes that there could be

alternative organizational models where a direct CEO report may still not be part of the

top management team (e.g., in small towns the CAO could direct the outsourced IT

function without the IT contact being part of the TMT). This is summarized in Figure 4.
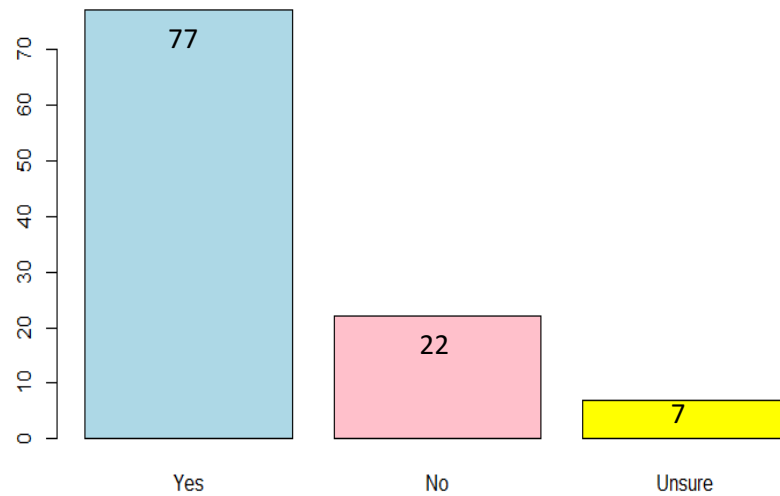
Figure 4: IT Leader is a Member of the TMT

Question 5 determined the reporting level for the senior IT leader if they were not a direct report to the CEO. This was described in terms of "steps away" from the CEO. For example, reporting to the Finance Director who then reports to the CEO would be considered two levels. For this survey item, the mean was 1.15 with a standard deviation of 0.36 (n = 111). The minimum was 1 which would correspond to being a direct CEO report and the maximum response was 2.

The number of IT employees within the organization was addressed in Question 5. With an n = 91, the mean number of employees reported was 3.13 (*SD* = 2.8) and a range of 0 to 13. The 0 would signal an organization that had completely or nearly completely outsourced their IT function. Figure 5 shows the frequency table of the number of employees reported.
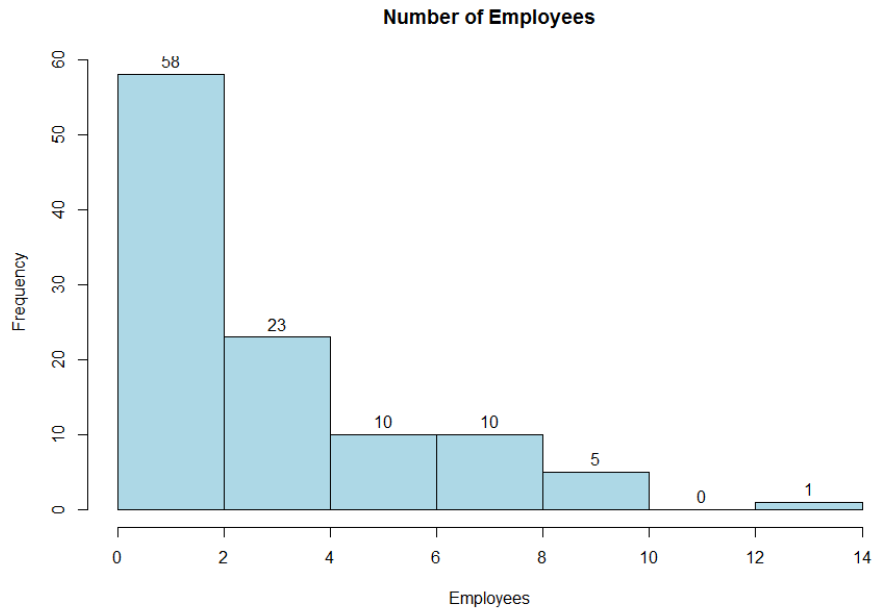
Figure 5: Number of IT Employees

The annual IT and city budgets were captured by Questions 6 and 7. In a few cases, the city budget was not reported. However, this was corrected through the use of public documents like city council minutes and annual audit reports. The mean IT budget for all respondents (n = 89) was $584,946.00 ($SD$ = $589,942.00) and a range of $7500.00 to $2,785,583.00. The mean city budget reported (n = 89) was $41,806,033.00 ($SD$ = $41,620,418.00) and a range of $600,000.00 to $ 220,881,110.00. It is useful to note that both measures show similarly large positive skews of 1.6 and 2.0, respectively. On average, the IT budget was 2% of the reported city budget. This uniformity can be seen in the histogram plots, Figure 6 and Figure 7.
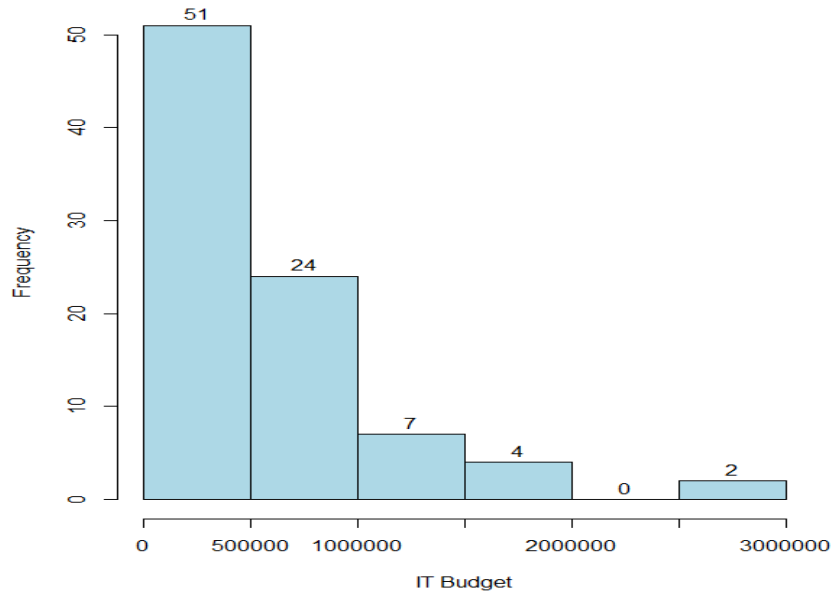
Figure 6: Reported IT Budget
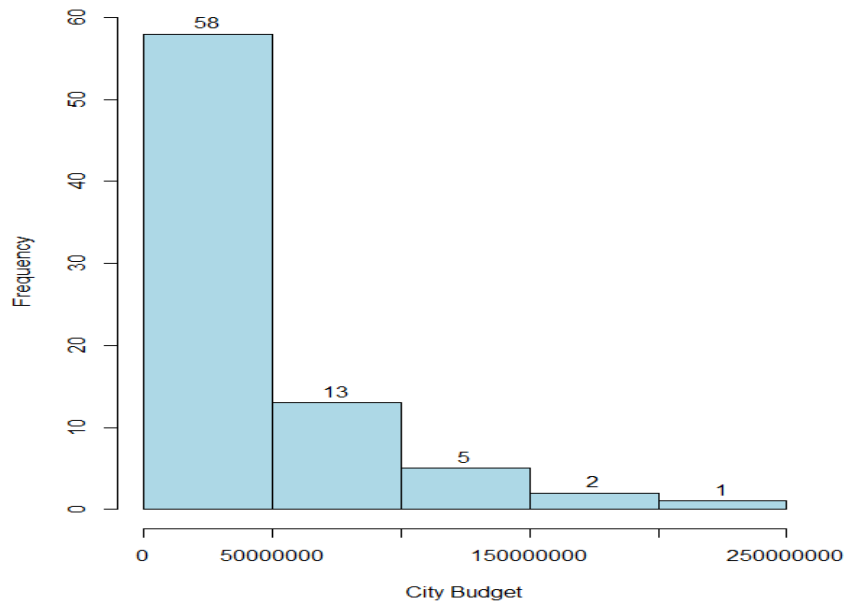
Figure 7: Reported City Budget

Question 8 captured the estimated percentage of the IT function that the city has outsourced. With n = 88, the mean was 24.8 and (SD = 35.7). Of particular note, 26 respondents reported no outsourcing (0) while 14 respondents reported complete outsourcing (100%) of the organization's IT function.

Finally, the level of IT centralization within the organization was assessed. The possible answers for this question were Yes, No, and Unsure. The responses (n = 100) are summarized in Figure 8. However, given questions of clarity raised by respondents, this variable was collapsed to just "Yes" or "No" for calculations.
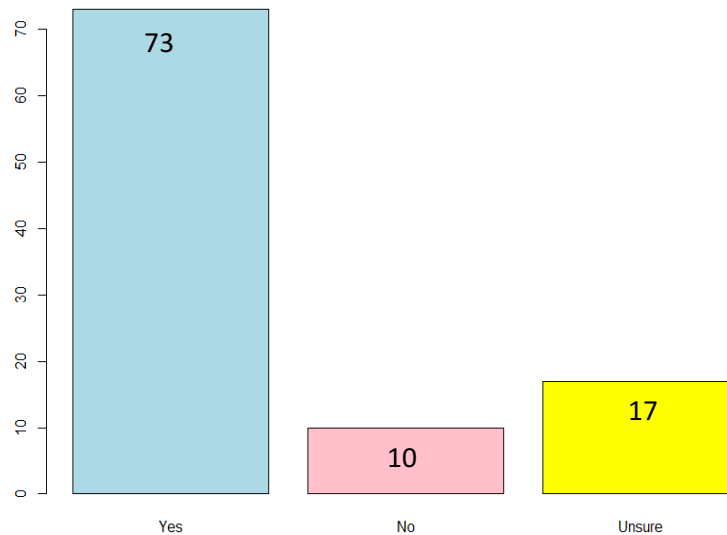
Figure 8: IT Organization is centralized

The next section of the survey was a Likert scale that measured the senior IT leader's perception of IT strategic alignment (OPSA) within the organization. The ten items on the scale were designed in a "forced choice" manner to disallow a neutral response. Given the exploratory nature of this inquiry, that was reasonable. Two items in the scale were reversed in regards to the overall scale. This was taken into account when analysis was completed on the survey instrument. The items are summarized in Table 5.

Table 5: Likert Scale Summary

Perceptions of IT Strategic Alignment, n = 84		
Characteristic	Agree/Strongly Agree	Reverse
(l1) IT is a strategic planning partner	80%	
(l2) IT is a partner in budget forming	81%	
(l3) IT leader is knowledgeable about other functions in the city	77%	
(l4) City leadership understands IT	71%	
(l5r) IT Leader does not only communicate with city leaders through formal channels	73%	Reverse Coded
(l6) IT leader's work experience is similar to other city leaders	49%	
(l7) IT leader has opportunities to educate other city leaders on benefits of technology	89%	
(l8) IT is properly placed within the organizational structure.	71%	
(l9r) Cost is not the sole factor in IT initiatives	9%	Reverse Coded
(l10) City leaders regularly consult with the IT leader	59%	

Figure 9 illustrates the results and provides evidence for the first research question.
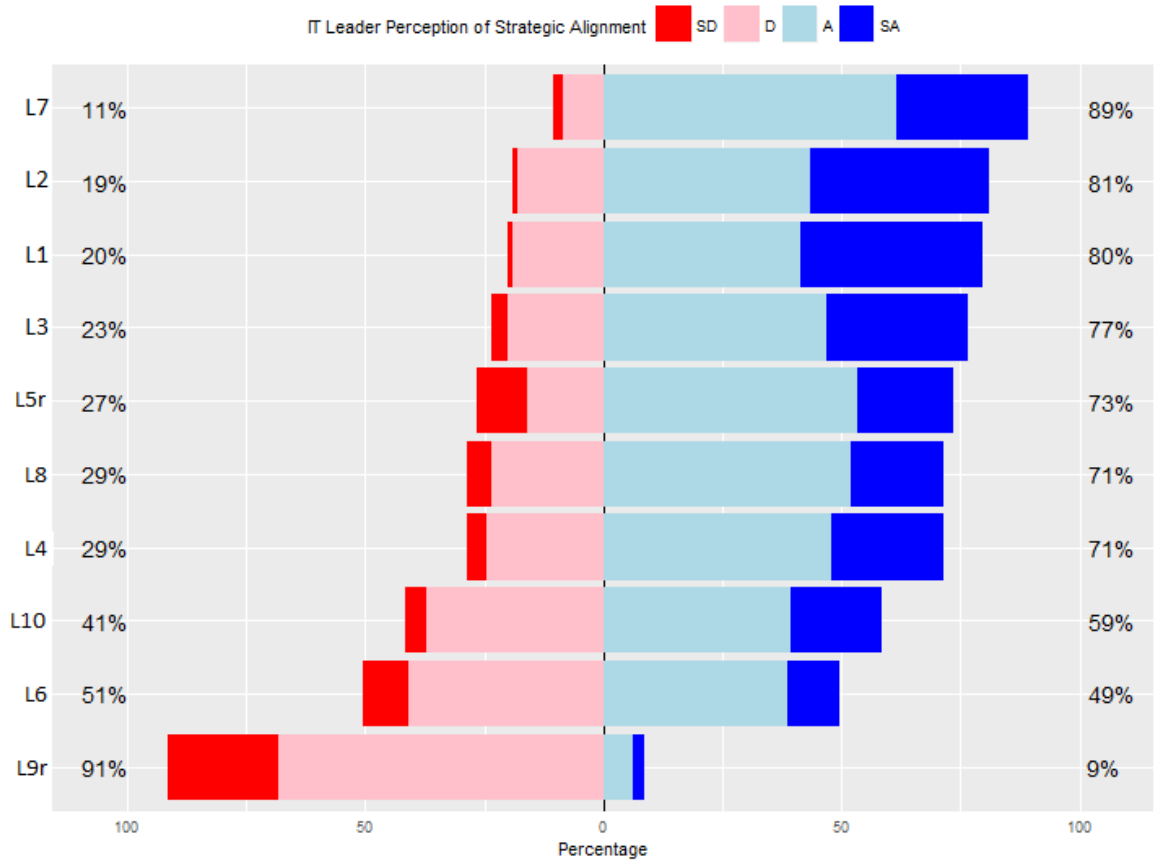
Figure 9: IT Leader Perception of Strategic Alignment

The third section of the survey focused on exemplars of actual strategic alignment within each responding city's information technology function. The provided examples were: evidence of project management, outsourcing efforts, free and open source software initiatives, and an information security concentration within the organization. These four factors were assessed with a series of Yes or No questions. Answers for each exemplar were then summed. Those individual exemplar sums were then summed into a composite exemplar score, Overall Actual Alignment Score (OAAS). The values for each are summarized in Table 6.

Table 6: Exemplar Score Summary

Exemplar (Variable Name)	n =	Total Possible	Mean	Standard Deviation
Project Management (PMSum)	80	9	6.1	1.92
Outsourcing (OSSum)	37	8	4.78	1.34
Free/Open Source Software (FossSum)	13	7	4.46	1.27
Information Security (ISSum)	59	5	2.53	1.24
Total Exemplar Sum (OAAS)	88	29	9.91	5.03

The relatively low responses on three of the components in this section of the survey may lessen its ability to provide useful information. The survey tool was designed to utilize a skip logic flow such that if a respondent answered in the negative to the first question then they never saw the subsequent questions.

Lastly, the survey requested several optional pieces of information from the respondents. Q13 recorded (Figure 10) the number of years (n = 86) that the IT leader
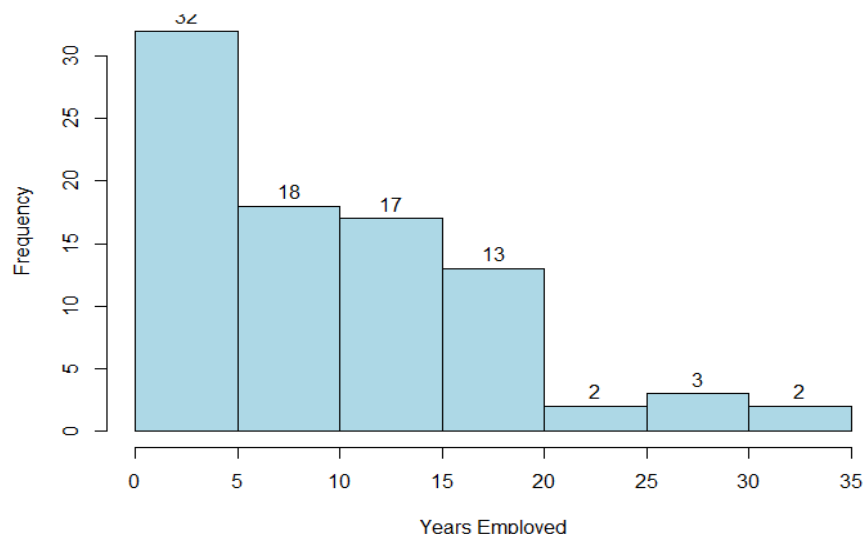
Figure 10: Reported Years of Employment

had been in his or her position. The mean length of service was 10.16 years ($SD = 7.31$) and a range of 1 to 35.

Questions 14 and 15 were dichotomous variables indicating the type of training that the senior IT leader may have acquired over their academic and professional life. Question 14 (n = 88) specifically asked about formal information or information systems training. Question 15 (n = 86) asked about formal business or public technology administration training as might be representative of someone with a background more in line with development as a city manager. Table 7 summarizes the response to these two questions. Of particular interest would be the fourth cell that indicates those respondents with both formal IT training and business training.

Table 7: Reported Training of IT Leader

	No Business Training	Business Training
No IT Training	10	21
IT Training	25	23

Question 16 requested that the respondents report their current salary. Of the respondents reporting (n = 75), the mean salary was $80, 488.09 ($SD$ = $21, 671.74). The range of salaries was from $42,000.00 to $135,000.00.

The final metric for the survey was taken after data collection was completed. One research question involved the distance from the responding city to the nearest metropolitan statistical area. This was completed with a mean distance of 31.53 miles ($SD = 22.73$). The range of distances was 1 (responding city is in a metropolitan statistical area) and 136 miles. This data was further broken down into a two factor

variable representing a near and far commute distance. This was calculated at the 30-mile point based upon research into the average U.S. commute time being reported from 25.1 minutes (McKenzie and Rapino 2011) to 45 minutes (Vasel 2015). The logic here is that even at a likely unobtainable, continuous driving speed of 60 mph, cities more than 30 miles away from a metropolitan area would become increasingly unattractive to IT professionals when considering job opportunities. This in turn would limit those cities when recruiting, hiring, and retaining.

Correlation Analysis

Utilizing the R *corr.test* package, the entire correlation matrix for all variables accounted for in the survey was constructed. The full matrix can be viewed in Appendix I. Many variables were only weakly correlated either positively or negatively. Some variables indicating moderate to strong correlations were expected. Examples of these were the correlations between IT budget and number of IT employees (0.45) or the moderate correlation between reported salary and IT budget (0.44). However, there were specific correlations that were of particular note. All had p values of 0.05 or less. Statements of weak, moderate, or strong follow Cohen's descriptors of $r = 0.10, 0.30,$ and 0.70 respectively (1988).

- Population was moderately negatively correlated with IT outsourcing at -0.38, and moderately positively correlated to the IT training of the respondent (0.30) while being moderately negatively correlated with business training (-0.29)
- The presence of an IT strategic plan was moderately positively correlated with both the city population (0.32), the IT training of the respondent (0.33), and the city budget (0.31)

- The number of IT employees in the organizations was moderately negatively correlated with the percentage of IT outsourcing undertaken by the city (-0.55), moderately positively with the IT training of the respondent (0.37) and weakly negatively with business training (-0.27)

- The reported IT budget was moderately negatively correlated to the percent of IT outsourcing (-0.25)

- The percent of IT outsourcing was moderately negatively correlated with the leader's IT training (-0.46) and moderately positively correlated with those respondents indicating formal business training (0.37)

- The centralization of IT in the organization was moderately positively correlated with the IT leader's reported salary (0.41)

- The presence of a project management function in the organization was moderately positively correlated with the reported salary of the IT leader (0.28)

- OPSA (leader's perception of strategic alignment summary score) was positively correlated with membership in the top management team (0.37)

As indicated in Chapter 3, the specific correlations between the Likert scale items that represented an IT leader's perception of strategic alignment were calculated utilizing Kendall's tau. Figure 11 summarizes those correlations with a p value of 0.05 or less.
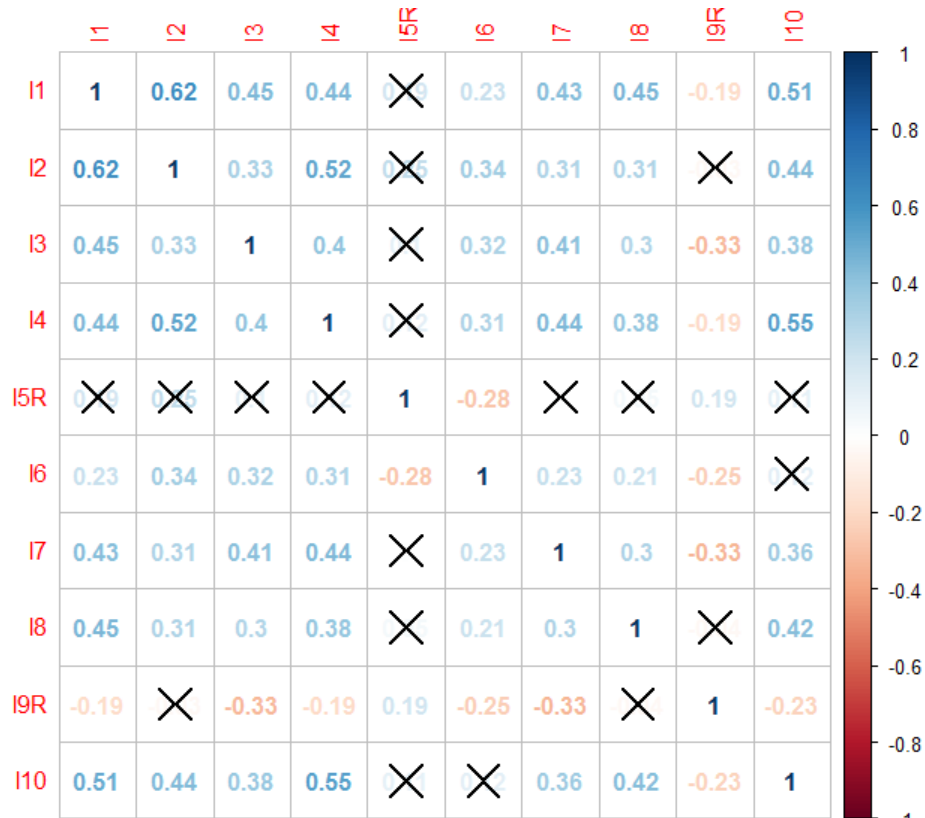
Figure 11: Significant Correlations of OPSA Scale Items (using Kendall's *tau* and
p < 0.05)

Research Questions

As discussed in the previous chapter, there were several research questions this inquiry was designed to answer. It is necessary to reiterate that the response rate for the survey was quite low at 11% so any generalizations based upon the data or hypotheses analysis should be strongly considered in that light.

The first question was: Does IT leadership perceive the IT function to be strategically aligned within the organization? This question is primarily addressed in the survey through the use of the 10-item Likert scale. Responders were asked to rate various statements related to the concept of IT strategic alignment on a scale of 1-4 with one being an expression of strong disagreement and 4 being one of strong agreement. Figure 9 above clearly indicates that there is a strong feeling of IT strategic alignment

among those responding to the survey. Additionally, a one-sample *t* test was computed against the Likert perception scale ($\bar{x} = 29.6$). This test was performed with the null hypothesis that the true OPSA mean would not be significantly greater than $\mu = 25$. The assumed population mean 25 is simply the midpoint between the minimum possible OPSA score (10) and the maximum (40). The *t* test indicated that the true mean is greater than 25 ($p < 0.01$). It is highly unlikely that we would encounter such a high OPSA sample average if IT leaders perceived little or no strategic alignment in their respective organization. Based upon this test and the visualizations provided in Figure 9, the null hypothesis H_{0A} stating that IT leaders will not perceive the IT function to be strategically aligned within the organization was rejected.

The second research question was: What demographic and structural aspects of an organization most influence the perception of strategic alignment? As described in Chapter 3, this question would be analyzed through the use of a multiple linear regression model such that:

OPSA=b0+b1*CPop+b2*YEmp+b3*ITTrain+b4*BTrain+b5*DR

ep+b6*MTMT+b7*ITEmp+b8*ITBudget+b9*Pout+b10*ITCent

In running the multiple regression assessment, none of the included variables offered were significantly explanatory for the value of OPSA with the indicated model. However, it was noted that the IT Budget variable was highly skewed at 6.80. An option for highly skewed variables is to transform them with a numerical function such as the natural logarithm (Benoit 2011). The natural logarithm of the IT Budget variable

(log(ITBudget) has a skew of -0.50 and a relatively normal distribution as demonstrated in Figure 12.
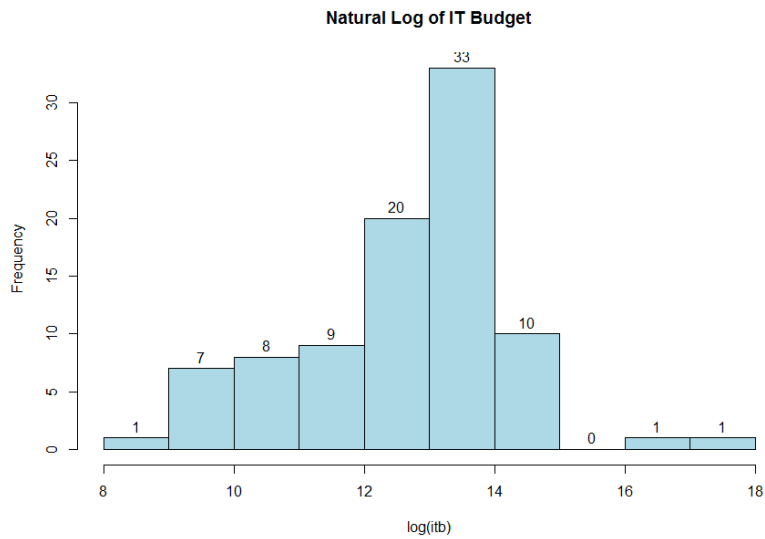
Figure 12: Distribution of log(ITBudget)

In considering this new model such that:

OPSA=b0+b1*CPop+b2*YEmp+b3*ITTrain+b4*BTrain+b5*DR

ep+b6*MTMT+b7*ITEmp+b8*log(ITBudget)+b9*Pout+b10*ITC

ent

The dependent variable OPSA was found to be significantly influenced by independent variables indicating the respondent had some formal IT training (ITtrain) and membership in the top management team (MTMT) at $p < 0.1$. In this scenario, the IT leader's perception of strategic alignment was found to be significantly dependent on their training and placement in the organizational structure.

However, given the more traditional acceptable $p < 0.05$, the null hypothesis, H_{0B}, that the IT leader's perception of strategic alignment is not significantly influenced by the independent variables suggested in the original regression model must be accepted. In regressing over the observable signs of strategic alignment (OAAS) such that:

$$OAAS=b_0+b_1*CPop+b_2*YEmp+b_3*ITTrain+b_4*BTrain+b_5*DRep$$

$$+b_6*MTMT+b_7*ITEmp+b_8*ITBudget+b_9*Pout+b_{10}*ITCent$$

None of the independent variables in the regression offered significant explanatory value for OAAS in either the original model or the model adjusted to account for the skew in the city's IT budget.

The third research question was: Do IT leaders in cities near metropolitan areas perceive more strategic alignment of IT than those in more rural locations? This question was answered using the summary statistic for perception of IT strategic alignment, OPSA, and the distance of the responding city to the nearest metropolitan statistical area. This distance measure was determined by the investigator after the surveys were complete. There is mixed research to determine what constitutes near or far in the context of this study. Based upon the earlier cited research concerning commute times, the investigator chose a 30-mile distance as a reasonable threshold for what a person may consider a tenable daily commute.

Once the surveys were complete and distances calculated, the OPSA scores were sorted into NEAR and FAR bins. A two-sample t test was then computed to compare the mean OPSA and determine if the mean for the NEAR group was greater than the mean of the FAR group. The average OPSA of the NEAR group was 28.6 and the average of the FAR group was 26.8. The test, $t\,(49) = 2.25$, $p < 0.05$ indicated that at a 30-mile radius, the null hypothesis, $H_{0C,}$ that the true difference in means of the two samples is 0 can be rejected. The nearly two-point difference, while small, indicated that there is a statistically significant difference between the perceptions of IT leaders living near a metropolitan area versus those that are in more rural areas.

The final research question was: Is there a positive relationship between the perception of strategic alignment by IT leadership and the actual level of alignment as demonstrated by recent significant projects? In considering the two variables OPSA (perception of strategic alignment) and OAAS (actual strategic alignment), a correlation was calculated and tested. The Pearson's product-moment correlation was calculated to be $r = 0.35$ ($p = 0.03$). The correlation between the two scores is small but statistically significant and suggests that an organization's actual alignment is related to the IT leader's perception of strategic alignment. The null hypothesis, H_{0D} that there is no significant correlation of the IT leader's perception of strategic alignment and the measure of actual strategic alignment can be rejected.

Chapter V

DISCUSSION

As noted in the introduction, the intent of this inquiry was to determine the level at which the senior information technology leaders in small city governments perceive strategic alignment within their respective organizations. Along with that primary intent, there was also a desire to begin, in an exploratory manner, ascertaining the various factors that influence that perception. It is the intent of this investigator to add to the research surrounding the subject of information technology strategic alignment in the public sector which has been characterized as lacking (Dunleavy et al., 2006, Pollitt 2010). This inquiry also augments the body of research by specifically considering small city governments.

Given the argument that constituents are becoming more expectant of e-government type services, as made in the introduction, it stands to reason that a properly aligned IT function within an organization is beneficial. This is particularly true in smaller organizations with limited budgets and where missteps can be not only costly but reputation damaging (Wagner, Beimborn, and Weitzel 2014). However, successes can potentially provide a flexible and responsive government at the level closest to the consumer (Gajendra, Xi, and Wang 2012). Given the previous research, and lack thereof, the findings in this inquiry should offer some insight and starting points to ensure that as government and public facing technologies evolve, the IT function, in whatever form, is strategically positioned to support the organization to the best of its abilities. The

following sections will more closely consider the significant findings, the notable

correlations found, and the practical considerations of the research that will inform both

the academician as well as the field practitioner.

Significant Findings

Several significant findings were made clear when the analysis of the data

commenced. Primarily, these focused around the four research questions. However,

there were other interesting findings to consider as well.

Research Question 1 was concerned with determining whether not senior IT

leadership perceives the IT function to be strategically aligned within their individual

city's government. As the data indicated, the answer for those responding was yes, they

did perceive the function to be strategically aligned. Of the 10 items on the Likert scale

measuring their perception, 7 of them had Agree/Strongly Agree responses of over 70%.

More specifically, several of those involving communication between IT leadership and

organizational leadership (strategic planning partner, budget forming partner, knowledge

of other city functions, and ability to educate organizational leadership) were over 80% in

agreement response. These results would seem to agree with the earlier work done by

Luftman and Preston and Karahanna (2003; 2004; 2009). Interestingly, the only item to

show very low agreement was that concerning cost in relation to IT projects. Despite

indicators of full strategic partnership within the organization, cost remained a key

influencer on city leadership. However, it is not unreasonable to assume that this would

be true for any number of city functional leaders that could be potentially studied.

The second research question of the inquiry was to determine the specific

structural and demographic influences on the perception of strategic alignment by the

reporting senior IT leader. As noted in Chapter 4, the model suggested did not indicate any significant influences attributable to the independent variables. However, when adjusting for the city budget variable in a statistically appropriate manner, both the independent variables for formal IT training (of the senior IT leader) and inclusion in the top management team did offer minimal explanatory value. This coincides with the research previously reviewed. Most notably, the inclusion in the top management team is strongly indicated as a potential precursor to strategic alignment by Preston and Karahanna (2009). This is also congruent with research by Merwin et al. (2005) and Luftman (2003). Further, when deploying advanced model selection routines in the R software such as the *leaps* package, virtually every ideal model included the top management team membership variable. This is predicated on minimizing the Bayesian Information Criterion in a variable inclusion process (Sematech 2010). This is illustrated in Appendix J.

It is also true that when regressed against the variable indicating the actual strategic alignment score, there were no significantly explanatory independent variables. However, this may be largely due to the few number of responses and critical issues with the design of that portion of the survey instrument. This will be further discussed in a later section.

Research Question 3 concerned itself with the determination if there was a difference in perception of those IT leaders in cities outside of larger urban areas. As noted in Chapter 3 and Chapter 4, the determination of "far" is somewhat subjective. However, given the proposed 30-mile radius, the research did suggest that there is a small but significant difference between the perceptions reported by the two groups. As noted

in Chapter 1, the difference could simply be related to the fact that metropolitan areas have greater access to information technology professionals than do those that are further out with limited attractiveness to a trained and mobile workforce. The difference in score means of less than two points must also be considered. While statistically significant, it may not indicate a particularly viable research avenue. This is particularly true when considering that the methodology did not account for traffic patterns, public transport, or telework options that might be provided by the organization. However, there may be still opportunities for more revealing research regarding the specific location of cities given more refined research instruments as suggested by Merwin et al. (2005) in not including cities that were within close proximity to large metropolitan areas.

Finally, the last research question was concerned with the correlation between the senior IT leader's perception of strategic alignment and the indicator of actual alignment as represented by the various exemplars. While the research did suggest a weak to moderate correlation, there are issues with this particular portion of the investigation. In retrospect, there were a number of respondents that had minimal scores on this portion of the survey. This was likely due to the mechanics of the survey not showing all the items related to the specific subject (e.g., project management) if the initial answer was negative. Further, it would be difficult to create an exhaustive list of activities that would indicate actual alignment. It may well be that a city with a high level of alignment simply did not exhibit any of the specific examples provided by this survey instrument. However, even with limited viable responses, the correlation indicated seems to suggest that the perception score would be positively correlated with actual alignment evidence if appropriate and sufficient exemplars were provided.

Other Findings

Outside of the four research questions, there were additional interesting findings that manifested when the data was being analyzed. Some of these related to the characteristics of the responding cities, and others related to surprising correlations that were not expected at the outset of the inquiry.

The distribution of the city populations was not normal and had a mean and median of less than the expected midpoint of 25,000. At least for the states selected for study, there seems to be a significant gap in cities with populations of 30,000 – 50,000. This might suggest a refinement to the instrument in considering the size of cities to include in future iterations of or augmentations to the study.

Somewhat surprisingly to the researcher, the number of cities reporting the IT senior leader as a member of the top management team was fairly high at 77 ($n = 116$). It had been anticipated that the number would be considerably lower. However, this does agree with both the reported high level of perceived strategic alignment and the research suggesting that inclusion in the top management team strongly enables strategic alignment to flourish (Preston and Karahanna 2009).

There was a high level of uniformity in the distribution of the city's IT budget versus the overall city budget. As noted in the previous section, cost is still a strong motivator in regards to IT initiatives within organizations regardless of the level of perceived strategic alignment or sub-factors such as top management team membership or the ability to educate the city leadership. This is in line with Banker et al. that suggest IT is seen as a cost center (2011), and there may be some underlying common numerical budgetary aspect that is heretofore unexplained.

The reported years of employment was somewhat low with a mean of 10 years

and a median of 8 years. This may suggest that many are simply being hired for their

technological expertise and for a relatively short and less strategic tenure (Milovich

2015). This would make sense given the average number of employees reported at just

over three. For most reporting cities, the senior IT leader likely serves a very technical

role, being perhaps her most significant role, as well as being the strategic IT messenger.

The low tenure reported could also indicate that the IT function is only recently emerging

as a strategic partner within the organization and how it is perceived by other city leaders.

The number reported does contradict some research indicating an average tenure of 3.4

years for senior IT leaders in the public sector (Thibodeau 2013). This could partially be

due to perceived stability (albeit lower pay) in the public sector or retirements being

delayed due to the economic environment.

Correlations of Note

Outside of the demographic and structural data, there were several intriguing

correlations that were found during the data analysis. Some of these may suggest

possible refinements of the instrument or whole new avenues of research.

Among the individual Likert scale items that captured the perception of IT

strategic alignment, there were several that were moderately to strongly correlated. One

of the strongest correlations recorded (utilizing the conservative Kendall's tau) was that

between the indicator of being a strategic planning partner and a budget partner. While

the correlations would seem to be obvious, it is important in suggesting that participating

in planning leads to appropriate budgeting for IT success. While distinct activities, the

senior IT leader should be a participant in both if strategic alignment (from the IT

leader's perspective) is to be ensured. Similarly, there is moderate positive correlation between the city leadership's understanding of the ability of IT and budget planning. Tied to those as well is the ability for IT leadership to educate the city leadership. Again, this is reflective of the benefit of the top management team membership (Preston and Karahanna 2009). Further, the city leadership's understanding of IT is positively correlated with their willingness to consult with IT leadership on future projects. Given the number of IT projects to fail or underperform (Cats-Baril and Thompson 1995), this is an important nexus of correlations that would warrant further exploration.

Among other data collected, other correlations were of note. A full correlation table can be reviewed in Appendix I. Population and the percent of IT outsourcing were moderately negatively correlated. This may suggest that smaller cities are turning to outsourcing as an option to either save money or gain hard-to-acquire skills and services (Cox et al., 2011). The cost-saving aspect is further bolstered by a correlation with the outsourcing percentage and the senior IT leader having had some type of formal business or public administration training. Interestingly, the percent of outsourcing is negatively correlated with the IT leader having had formal IT training. Additionally, the likelihood of a senior IT leader with formal IT training increases with city population while the percent of IT outsourcing decreases. The data suggests that as city size increases, the IT function becomes more formal and there is less need to outsource the function (excepting purely monetary reasons). These correlations would align with Chen and Perry in suggesting that smaller cities are more in need of deep skillsets and see outsourcing as a solution as opposed to those of larger sizes and greater resources (2003).

It was also found that the reported salary was correlated with the centralization of the IT function within the city. This may be related to the formalization of the IT department within the city hierarchy and recognition of the need for an actual chief information officer type role within the organization.

Finally, the overall perception score garnered from the Likert scale was found to be positively correlated to the inclusion in the top management team. This again reaffirms a common theme throughout the data and findings that the ability to meet and communicate with other city leaders positively impacts the perception of strategic alignment.

Limitations of the Research

There are several limitations to the research presented herein that must be acknowledged as they affect the generalizability of the findings. Several have been alluded to in previous sections but will be more fully examined here.

As presented in Chapter 4, the response rate to the surveys was quite low. Only 10% of the surveys were returned and of that number, only 116 included enough data to be viable for inclusion. As the survey was anonymous and voluntary, it is difficult to assert why the response rate was so low or what remediation might be suggested for further iterations. There was no incentive provided, and that might be an avenue to increase the response rate. Also, as stated in Chapter 3, where the senior IT leader was not easily identified, then the survey was sent to the senior administrative officer with a request that it be forwarded on to the senior IT leader. Obviously, there were many that may not have done so, and in some cases, the administrative officer indicated that they

were completing the survey. However, it is possible that some completed the survey without indicating that they were not the senior IT leader.

Several questions were highlighted as confusing or unclear by participants through emails to the researcher. A specific example was the question regarding centralization of the IT function. Even though an "Unsure" option was provided, some found it difficult to answer. In hindsight, the definition of centralization in regards to organizational structure should have been clarified. For the data analysis, the "Unsure" answer was collapsed with the "No" response into one factor. This decision was predicated on the researcher's belief that it would be unlikely that the respondent would be unsure where centralization is the model as well as the relatively low number of "Unsure" responses. Similar adjustment was made for the variable tracking top team management inclusion.

Unfortunately, the section concerning the score for actual alignment was problematic. Several sections had very low response rates. Most notably, the section concerning the utilization of free or open source software only had 13 responses. Also, as has been previously mentioned, the skip logic utilized by the survey may have artificially contributed to some scores being lower than they should. For future deployments of the survey, this section should be revamped or dropped. One option could be to employ a more qualitative approach that would allow the respondent to respond with examples of significant projects their organization has undertaken with follow-up questions to generate an overall more descriptive measure of actual alignment.

Additionally, the researcher would be hesitant to attribute too much significance to the consideration of perception of strategic alignment and distance from a metropolitan

area. As described, this calculation was done after surveys were complete and only considered as the shortest distance between the responding city and the closest metropolitan statistical area. This is likely not strongly representative of the difficulty smaller, more rural cities may have in attracting and keeping talent. Further, other options may ameliorate some of those issues including quality of life factors, geography, public transit, and alternate work arrangements to include telework or flexible scheduling. Future adaptations of this study would be made more generalizable by considering these factors, to include direct queries to the responding official.

Finally, a concern regarding the research overall is related to the methodology for acquiring respondent contact information. It was revealing how little information was available on many cities' public websites. Nearly half of the sites accessed had no directory information for any city leaders. Oftentimes, if a directory was present, the IT leader was not among those listed even when other documents (e.g., CAFR's, council minutes, budget documents) indicated that there was an IT function within the organization. Additionally, public websites were often not updated and presented incorrect information. In some cases, the senior IT leader had made efforts to mask his email by not following the city's standard email format such as first name dot last name. It could possibly be that this is an outward indication of the ongoing transition of IT from a backroom operation to one that actually works and serves constituents directly.

Indications for Further Research

This inquiry was meant to be exploratory and suggest options for further research as related to the topic of IT strategic alignment. Despite the issues highlighted in the previous section, there are some specific research refinements that can be suggested.

The survey collected limited demographic data on the senior IT leader. Years employed, salary, and training were collected. However, gender, ethnicity, and previous experience (particularly transitions from private to public) might provide interesting insight to the question of strategic alignment. For example, Gartner recently found that women IT leaders are more positive about the ability of predictive analytics than their male counterparts (Gardiner 2015). Potential differences like these better describe a changing public sector IT landscape particularly over time.

While this inquiry focused on information technology leadership, there is likely much to be learned from a similar study of other organizational leaders. This may be particularly salient in smaller cities where the chief administrative officer is the same as the mayor or other elected official and perhaps only serves in a part-time capacity. That response could then be contrasted with those chief administrative officers serving in a town manager capacity. Organizational placement, channels of communication, and training credentials could all take on very different significance by approaching the topic in this manner.

Finally, as noted in the previous section, the entire effort to capture examples of actual alignment needs to be reexamined. It may well be that the ability to capture that in an online survey is difficult to the point of being impossible. There is, however, in this researcher's mind, a need to consider the perception of IT strategic alignment in regards to an assessment of actual alignment. In doing so, it would go far in counteracting some forms of bias in the online instrument. One such significant bias would be that of social desirability bias that King and Bruner indicate is particularly worrisome in psychology and the social sciences (2000). Creating an appropriate instrument for capturing actual

alignment and deploying it would likely be considerably costlier in terms of time, analysis, and money (assuming travel).

Practical Considerations

There are several practical considerations that one may draw from this inquiry that inform both the theorist and the practitioner. Such considerations are largely drawn from the research questions and their specific results.

Survey respondents did largely perceive the IT function to be strategically aligned within the city organization. The practical utilization of this finding would be to continue emphasizing those criteria that seem to foster this perception within the organization. While a perception of such may not actually be causally linked to performance, it likely leads to an atmosphere where success is more likely. The preponderance of prior research argues this clearly. For organizational interventionists, arguing for the IT leader to be a part of strategic planning and budget formation is critical.

Along similar lines and more critically, the one common finding throughout the research was the importance, in regards to strategic alignment, for the senior IT leader to be a member of the organization's top management team. This is supported by much of the research that preceded this inquiry.

From an academic standpoint, the exclusion of the senior IT leader could suggest several things about the organization that may be cautionary for future research. The organization may too small or too immature to have an effective, or even measurable, information technology function. Even if present, the organizational leadership may be predisposed to view it as only a cost-center with little input where strategic planning is concerned.

Inclusion in the top management team would suggest that the organizational leadership has an appreciation for the role that information technology can play as the city moves to better support its constituents in an ever increasingly computerized and connected society. The city's leaders have moved past viewing IT as simply something that must be paid for and providing only a back office function. More importantly, the function will have likely pivoted to a more customer-facing orientation. There are interesting parallels that can be drawn between information technology as a strategic partner in regards to research in the public sector as it works, and often struggles, to mimic the same in the private sector.

For the practitioner, this inquiry has strongly highlighted the need for a strong, robust, and bi-directional communication channel between the organizational leadership and the senior technology leader. Even in organizations where there may be resistance to having the CIO as a member of the executive group, there is a strong argument for strengthening and expanding the ability of the two sides to influence and be influenced such that strategic partnering may be allowed to flourish.

An IT practitioner looking to address a dysfunctional technology function in an organization would be well advised to closely scrutinize and begin the remediation on the lines of communication between IT and organizational management. In ensuring this dynamic, or as close to it as feasible, key criteria for success like executive championship for projects, adequate funding, and overall expectation management will be more easily achieved.

If strategic alignment is not achieved in an organization, the consequences could be dire. In a best case scenario, the organization is not able progress and serve its

citizenry in a way they are becoming increasingly accustomed to in the private sector. In the worst case scenario, the organization may find itself throwing away tax dollars on ill-defined and poorly implemented projects that neither provide beneficial services to constituents nor create operational efficiencies for the city. Additionally, as Cats-Baril and Thompson (1995) point out, failed projects can easily cost an organization upwards of hundreds of thousands of dollars, if not millions.

Moreover, the proper strategic alignment of information technology within an organization regardless of size and sector is critical to the viability of that organization. An organization must be agile in today's environment as Tallon and Pinsonneault (2011) argue. It is rather easy to imagine the private sector business going under due to an inability to change and adapt. While the same fate may not manifest for a city, certainly services to citizens could suffer, population could decrease, and the revue base dwindle. Ultimately, virtually all challenges faced by an organization going forward will likely demand some application of information technology; therefore, strategic alignment speaks to the long term sustainability of the entity being studies.

Additionally, as there was a small but statistically significant difference in the perception of those IT leaders from rural cities versus those in more urban locations, there may be interventionist opportunities to enhance the possibility for success. The rural IT leader may develop a bolstered perception of alignment if allowed to draw upon resources not readily available within the city itself. Telework and other nontraditional work agreements may help create an environment in the rural organization that enables it to create a more properly aligned IT function, and more internally respected by city

leadership, without over committing organizational resources through extensive recruiting, aggressive retention activities, and problematic employee turnover.

Finally, there is indication that an environment that fosters a perception of IT strategic alignment is supportive of actual alignment. This is important in that activities that are aligned with the overall organizational plans will likely have better chances of success. City leadership will invest more in information technology, IT leadership will gain an increasing voice in strategic planning, and the public will be better served through judicious use of their monies and beneficial services gained.

Ultimately, the practical aspect of this research is to better inform how small organizations can better place and utilize the information technology function. This will minimize budgetary impact, increase organizational reputation, and encourage responsiveness to future demands.

Conclusion

As indicated by Wagner, Beimborn, and Weitzel, small organizations may well endure difficulties not shared by larger organizations when attempting to serve their constituency. If we further accept that services are best provided at the level closest to the consumer (Oates 1993), then the ability for IT to meet and answer those difficulties is growing increasingly important in a digital nation.

The perception of strategic alignment of information technology by the senior IT leader in small cities is influenced by a number of factors. These can include structural aspects of the city and demographic information about the leader. However, the research provided in this study strongly suggests that the senior IT leader's ability to effectively communicate with other city leaders is a critical component. This is supported by earlier

research, and this inquiry contributes to that body of work by looking specifically at small public sector entities.

Public sector leadership would do well to ensure that the senior IT leader is a member of their top management team. This facilitates communication, planning, and the ability to educate leadership on the potential for IT to meet the demands of a modern constituency. Ideally, the poor legacy of IT endeavors in the public sector will become increasingly rare as information technology leadership takes a seat at the strategic planning table.

REFERENCES

Avison, D. et al. 2004. "Using and Validating the Strategic Alignment Model." *The Journal of Strategic Information Systems* 13(3): 223–246.

Banker, R. D. et al. 2011. "CIO Reporting Structure, Strategic Positioning, and Firm Performance." *MIS Quarterly* 35(2): 487–504.

Baruch, Yehuda, and Brooks C. Holtom. 2008. "Survey Response Rate Levels and Trends in Organizational Research." *Human Relations* 61(8): 1139–1160.

Beaumaster, S. 2002. "Local Government IT Implementation Issues: A Challenge for Public Administration." In *System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on System Sciences*, p. 1725–1734. http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=994084 (Accessed September 23, 2012).

Beavers, Amy S. et al. 2013. "Practical Considerations for Using Exploratory Factor Analysis in Educational Research." *Practical Assessment, Research & Evaluation* 18(6): 1–13.

Benoit, Kenneth. 2011. "Linear Regression Models with Logarithmic Transformations." London School of Economics, London. http://www.kenbenoit.net/courses/ME104/logmodels2.pdf (August 22, 2016).

Boone, Harry N., and Deborah A. Boone. 2012. "Analyzing Likert Data." *Journal of Extension* 50(2): 1–5.

Bouras, Christos, Vasileios Kokkinos, and Georgia Tseliou. 2013. "Methodology for Public Administrators for Selecting between Open Source and Proprietary Software." *Telematics and Informatics* 30(2): 100–110.

Bretschneider, S. 1990. "Management Information Systems in Public and Private

    Organizations: An Empirical Test." *Public Administration Review*: 536–545.

Bryson, John Ad. 1988. "A Strategic Planning Process for Public and Non-profit

    Organizations." *Long Range Planning* 21.

    http://docushare.usc.edu/docushare/dsweb/Get/Document-8775/bryson+-

    +strategic+planning+for+non-profits.pdf (Accessed March 25, 2013).

Campbell, Bruce, Robert Kay, and David Avison. 2005. "Strategic Alignment: A

    Practitioner's Perspective." *Journal of Enterprise Information Management* 18(6):

    653–664.

Cats-Baril, William, and Ronald Thompson. 1995. "Managing Information Technology

    Projects in the Public Sector." *Public Administration Review* 55(6): 559–566.

Chan, Yolande E. et al. 1997. "Business Strategic Orientation, Information Systems

    Strategic Orientation, and Strategic Alignment." *Information Systems Research*

    8(2): 125.

Chen, Yu-che, and James Perry. 2003. "Outsourcing for E-Government." *Public*

    Performance & Management Review 26(4): 404–421.

Colwell, D. J., and J. R. Gillett. 1982. "66.49 Spearman versus Kendall." *The*

    Mathematical Gazette 66(438): 307–309.

Cox, Michael, Martyn Roberts, and John Walton. 2011. "IT Outsourcing in the Public

    Sector: Experiences Form Local Government." *Electronic Journal Information*

    Systems Evaluation Volume 14(2).

    http://www.ejise.com/issue/download.html?idArticle=771 (Accessed March 30,

    2013).

Cronbach, Lee J. "Coefficient Alpha and the Internal Structure of Tests." *Psychometrika* 16(3): 297–334.

Dunleavy, Patrick et al. 2006. "New Public Management Is Dead—Long Live Digital-Era Governance." *Journal of Public Administration Research and Theory* 16(3): 467–494.

Essers, Loek. 2013. "Switch to Open Source Successfully Completed, City of Munich Says." *PCWorld*. http://www.pcworld.com/article/2079800/switch-to-open-source-successfully-completed-city-of-munich-says.html (March 8, 2014).

Feeny, David F., Brian R. Edwards, and Keppel M. Simpson. 1992. "Understanding the CEO/CIO Relationship." *MIS Quarterly* 16(4): 435–448.

Gajendra, Sharma, Bao Xi, and Qiang Wang. 2012. "E-Government: Public Participation and Ethical Issues." *Journal of E-Governance* 35(4): 195.

Gardiner, Bonnie. 2015. "Women CIOs More Positive about Analytics and IT Budgets: Gartner." *CIO* (13284045): 1–1.

Gerrard, Paul, and Radia M. Johnson. 2015. *Mastering Scientific Computing with R*. Packt Publishing Ltd.

Grembergen, Wim Van. 2004. *Strategies for Information Technology Governance*. Idea Group Inc. (IGI).

Gupta, Atul, and Rex Hammond. 2005. "Information Systems Security Issues and Decisions for Small Businesses: An Empirical Examination." *Information Management & Computer Security* 13(4): 297–310.

Henderson, J. C., and N. Venkatraman. 1993. "Strategic Alignment: Leveraging Information Technology for Transforming Organizations." *IBM Systems Journal* 32(1): 4–16.

Hillenius, Gijs. 2013. "Free and Open Source Software Across the EU." *International Free and Open Source Software Law Review* 5(2): 153–64.

Holden, Stephen H., Donald F. Norris, and Patricia D. Fletcher. 2003. "Electronic Government at the Local Level: Progress to Date and Future Issues." *Public Performance & Management Review* 26(4): 325–344.

Holley, L. M., D. Dufner, and B. J. Reed. 2004. "Strategic Information Systems Planning in US County Governments: Will the Real SISP Model Please Stand Up?" *Public Performance & Management Review* 27(3): 102–126.

Hussin, H., M. King, and P. Cragg. 2002. "IT Alignment in Small Firms." *European Journal of Information Systems* 11(2): 108–127.

Ismail, N. A., and M. King. 2007. "Factors Influencing the Alignment of Accounting Information Systems in Small and Medium Sized Malaysian Manufacturing Firms." *Journal of Information Systems and Small Business* 1(1-2): 1–20.

"IT Security Staffing Level Breaks Downward Trend." 2011. *Computer Economics Report* 24(4): 10–18.

Jafari, Seyed Mohammadbagher. 2014. "Strategic Cost-Cutting in Information Technology: Toward a Framework for Enhancing the Business Value of IT." *Iranian Journal of Management Studies* 7(1): 21–39.

Johnson, Alice M., and Albert L. Lederer. 2010. "CEO/CIO Mutual Understanding,
    Strategic Alignment, and the Contribution of IS to the Organization." *Information
    & Management* 47(3): 138–149.

Kerns, Thomas, and Leslie Willcocks. 2000. "Exploring Information Technology
    Outsourcing Relationships: Theory and Practice." *Journal of Strategic
    Information Systems* 9(321): 350.

King, Maryon F., and Gordon C. Bruner. 2000. "Social Desirability Bias: A Neglected
    Aspect of Validity Testing." *Psychology and Marketing* 17(2): 79–103.

Kline, P. (1999). *The Handbook of Psychological Testing* (2nd ed.). London: Routledge

Lee, Gwanhoo, and Young Hoon Kwak. 2012. "An Open Government Maturity Model
    for Social Media-Based Public Engagement." *Government Information Quarterly*
    29(4): 492–503.

Li, Q. C., H. Niu, A. T. Papathanassiou, and G. Wu. 2014. "5G Network Capacity: Key
    Elements and Technologies." *IEEE Vehicular Technology Magazine* 9(1): 71–78.

Luftman, J. 2004. "Assessing Business-IT Alignment Maturity." *Strategies for
    Information Technology Governance* 4: 99.

———. 2003. "Assessing IT/Business Alignment." *Information Systems Management*
    20(4): 9–15.

McFadzean, Elspeth, Jean-Noel Ezingeard, and David Birchall. 2007. "Perception of
    Risk and the Strategic Impact of Existing IT on Information Security Strategy at
    Board Level." *Online Information Review* 31(5): 622.

McKenzie, Brian, and Melanie Rapino. 2011. Commuting in the United States: 2009. US
    Department of Commerce, Economics and Statistics Administration, US Census

Bureau. http://www.valleyrocket.com/uploads/5/1/2/6/5126199/census_data.pdf
(August 15, 2016).

McNabb, David E. 2013. *Research Methods in Public Administration and Nonprofit Management: Quantitative and Qualitative Approaches*. 3rd edition. Armonk, NY: M.E. Sharpe.

Merwin Jr., Gerald A., J. Scott McDonald, and Keith Merwin. 2005. "The Future of Information Technology in Local Government in Georgia: A Study of Planning and Implementation Policies." In *Southern Political Science Association (SPSA) 2005 Conference*, New Orleans, LA.

Milovich, Michael. 2015. "Keeping up with IT Strategy in a World of Constant Business Change." *MIS Quarterly Executive* 14(3): 125–35.

Moon, M. Jae. 2002. "The Evolution of E-Government among Municipalities: Rhetoric or Reality?" *Public Administration Review* 62(4): 424–433.

Ngeleza, Bangani, Peter Mkhize, and Sam Lubbe. 2009. "The Application of an Organic Model for Strategic Management to FOSS Migration Within the South African Public Sector." *Proceedings of the European Conference on Management, Leadership & Governance*: 133–40.

Oates, Wallace E. 1999. "An Essay on Fiscal Federalism." *Journal of Economic Literature* 37(3): 1120–1149.

Ortiz de Guinea, A., H. Kelley, and M. G. Hunter. 2005. "Information Systems Effectiveness in Small Businesses: Extending a Singaporean Model in Canada." *Journal of Global Information Management (JGIM)* 13(3): 55–79.

Pollitt, C. 2010. "Technological Change: a Central Yet Neglected Feature of Public

    Administration." *NISPAcee Journal of Public Administration and Policy* 3(2):

    31–53.

Preston, D. S., and E. Karahanna. 2009. "Antecedents of IS Strategic Alignment: A

    Nomological Network." *Information Systems Research* 20(2): 159–179.

Raphael, JR. 2014. "The Worst Cloud Outages of 2014 (so Far)." *InfoWorld*.

    http://www.infoworld.com/article/2606209/cloud-computing/162288-The-worst-

    cloud-outages-of-2014-so-far.html (December 3, 2014).

Reich, B. H., and I. Benbasat. 2000. "Factors that Influence the Social Dimension of

    Alignment Between Business and Information Technology Objectives."

    Management Information Systems Quarterly 24(1): 81–114.

Reich, B. H., and K. M. Nelson. 2003. "In Their Own Words: CIO Visions About the

    Future of In-House IT Organizations." *ACM SIGMIS Database* 34(4): 28–44.

Remler, D. K., and G. G. Van Ryzin. 2010. *Research Methods in Practice: Strategies for

    Description and Causation*. SAGE Publications.

Reynolds, Edward. 2012. "Mayor Edward Reynolds Interview." Bainbridge, GA.

Ring, Peter Smith, and James L. Perry. 1985. "Strategic Management in Public and

    Private Organizations: Implications of Distinctive Contexts and Constraints." *The

    Academy of Management Review* 10(2): 276–286.

Rossi, Bruno, Barbara Russo, and Giancarlo Succi. 2012. "Adoption of Free/libre Open

    Source Software in Public Organizations: Factors of Impact." *Information

    Technology & People* 25(2): 156–87.

Schlosser, Frank, Heinz-Theo Wagner, and Tim Coltman. 2012. "Reconsidering the Dimensions of Business-IT Alignment." *2014 47th Hawaii International Conference on System Sciences* 0: 5053–61.

Sematech, NIST. 2012. *E-Handbook of Statistical Methods*.

Sharf, Samantha. 2014. "What It Means for Home Depot If Data Breach Is Larger Than Target's." *Forbes*: 26–26.

Spagnoletti, PaoloFederici, Tommaso. 2011. "Exploring the Interplay Between FLOSS Adoption and Organizational Innovation." *Communications of the Association for Information Systems* 29: 279–98.

Stevens, John M. 1984. "Relationships between Top Level Managerial Strategies and Effectiveness in Local Government Management: Findings and Implications for Productivity Improvement." *Public Productivity Review* 8(4): 369–385.

Tallon, Paul P., and Alain Pinsonneault. 2011. "Competing Perspectives on the Link Between Strategic Information Technology Alignment and Organizational Agility: Insights from a Mediation Model." *MIS Quarterly* 35(2): 463–86.

Tat-Kei Ho, A. 2002. "Reinventing Local Governments and the E-Government Initiative." *Public Administration Review* 62(4): 434–444.

Thibodeau, Patrick. 2013. "Public-Sector CIOs Are Heading for the Exits." *Computerworld* 47(14): 6–6.

U.S. Census Bureau. "American FactFinder." http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src =bkmk (November 2, 2014).

Ven, Kris, and Jan Verelest. 2012. "A Qualitative Study on the Organizational Adoption of Open Source Server Software." *Information Systems Management* 29(3): 170–87.

Vasel, Kathryn. 2015. "We Spend $2,600 a Year Commuting to Work - Jun. 17, 2015." http://money.cnn.com/2015/06/17/pf/work-commute-time-and-money/ (August 20, 2016).

Wagner, Heinz-Theo, Daniel Beimborn, and Tim Weitzel. 2014. "How Social Capital among Information Technology and Business Units Drives Operational Alignment and IT Business Value." *Journal of Management Information Systems* 31(1): 241–272.

Wait, Patience. 2002. "Government Outsourcing Grows Fastest of All Sectors." *Washington Technology* 16(23): 17920–1.

Weinert, Stephan, and Kirsten Meyer. 2005. *The Evolution of IT Outsourcing: From Its Origins to Current and Future Trends*. Univ., Fachbereich Wirtschafts-und Sozialwiss. http://elpub.bib.uni-wuppertal.de/servlets/DerivateServlet/Derivate-775/ab0501.pdf (Accessed March 30, 2013).

Whitman, Michael, and Herbert Mattord. 2013. *Management of Information Security*. Cengage Learning.

Zaccaro, S. J., & Klimoski, R. J. 2001. "The Nature of Organizational Leadership: An Introduction". In *The Nature of Organizational Leadership: Understanding the Performance Imperatives Confronting Today's Leaders*, eds. Stephen J. Zaccaro and Richard J. Klimoski. San Francisco: Jossey-Bass, 3–41

Zhao, Jensen J., and Sherry Y. Zhao. 2010. "Opportunities and Threats: A Security

    Assessment of State E-Government Websites." *Government Information*

    Quarterly 27(1): 49–56.

Zickuhr, K., and A. Smith. 2012. "Digital differences." *Pew Internet & American Life*

    Project.

    http://alexa.pewinternet.com/~/media/Files/Reports/2012/PIP_Digital_differences

    _041312.pdf (Accessed December 4, 2012).

APPENDIX A:

Qualifying Cities

APPENDIX A:
QUALIFYING CITIES

Alabama

Alabaster
Albertville
Alexander City
Anniston
Athens
Atmore
Bessemer
Calera
Center Point
Chelsea
Cullman
Daphne
Enterprise
Eufaula
Fairfield
Fairhope
Florence
Foley
Fort Payne
Gadsden
Gardendale
Hartselle
Helena
Homewood
Hueytown
Irondale
Jacksonville
Jasper
Leeds
Madison
Millbrook
Moody
Mountain Brook
Muscle Shoals
Northport
Opelika
Oxford
Ozark
Pelham
Pell City
Phenix City
Pleasant Grove

Prattville
Prichard
Saraland
Scottsboro
Selma
Sylacauga
Talladega
Troy
Trussville
Vestavia Hills

Arkansas

Arkadelphia
Batesville
Bella Vista
Benton
Bentonville
Blytheville
Bryant
Cabot
Camden
El Dorado
Forrest City
Harrison
Helena-West Helena
Hope
Hot Springs
Jacksonville
Magnolia
Malvern
Marion
Maumelle
Mountain Home
Paragould
Pine Bluff
Russellville
Searcy
Sherwood
Siloam Springs
Texarkana
Van Buren
West Memphis

Florida

Altamonte Springs

Apopka
Atlantic Beach
Auburndale
Aventura
Bartow
Belle Glade
Bonita Springs
Bradenton
Callaway
Casselberry
Clermont
Cocoa
Cocoa Beach
Cooper City
Coral Gables
Crestview
Cutler Bay
Dania Beach
DeBary
DeLand
Destin
Doral
Dunedin
Edgewater
Eustis
Fernandina Beach
Florida City
Fort Pierce
Fort Walton Beach
Greenacres
Gulfport
Haines City
Hallandale Beach
Hialeah Gardens
Holly Hill
Jacksonville Beach
Key Biscayne
Key West
Lady Lake
Lake City
Lake Mary
Lake Wales
Lake Worth

Lantana
Lauderdale Lakes
Leesburg
Lighthouse Point
Longwood
Lynn Haven
Maitland
Marco Island
Miami Lakes
Miami Shores
Miami Springs
Mount Dora
Naples
New Port Richey
New Smyrna Beach
Niceville
North Lauderdale
North Miami Beach
North Palm Beach
Oakland Park
Ocoee
Oldsmar
Opa-locka
Orange City
Ormond Beach
Oviedo
Palatka
Palm Beach Gardens
Palmetto
Palmetto Bay
Palm Springs
Panama City
Panama City Beach
Parkland
Pinecrest
Pinellas Park
Plant City
Punta Gorda
Riviera Beach
Rockledge
Royal Palm Beach
Safety Harbor
St. Augustine
St. Cloud
Satellite Beach
Sebastian

Sebring
Seminole
South Daytona
South Miami
Stuart
Sunny Isles Beach
Sweetwater
Tarpon Springs
Tavares
Temple Terrace
Titusville
Venice
Vero Beach
West Melbourne
West Park
Wilton Manors
Winter Garden
Winter Haven
Winter Park
Winter Springs
Zephyrhills

Georgia
Acworth
Americus
Bainbridge
Brunswick
Buford
Calhoun
Canton
Carrollton
Cartersville
College Park
Conyers
Cordele
Covington
Cusseta-Chattahoochee
County unified
government
Dallas
Dalton
Decatur
Douglas
Douglasville
Dublin
Duluth
Dunwoody

East Point
Fairburn
Fayetteville
Forest Park
Gainesville
Griffin
Grovetown
Hinesville
Jesup
Kennesaw
Kingsland
LaGrange
Lawrenceville
Lilburn
Loganville
McDonough
Milledgeville
Milton
Monroe
Moultrie
Newnan
Peachtree City
Perry
Pooler
Powder Springs
Riverdale
Rome
St. Marys
Snellville
Statesboro
Stockbridge
Sugar Hill
Suwanee
Thomasville
Tifton
Union City
Vidalia
Villa Rica
Waycross
Winder
Woodstock

Illinois
Addison
Algonquin
Alsip
Alton

99

Antioch	East St. Louis	Lincolnwood
Barrington	Edwardsville	Lindenhurst
Bartlett	Effingham	Lisle
Batavia	Elk Grove Village	Lockport
Beach Park	Elmhurst	Lombard
Belleville	Elmwood Park	Loves Park
Bellwood	Evergreen Park	Lyons
Belvidere	Fairview Heights	McHenry
Bensenville	Forest Park	Machesney Park
Bloomingdale	Fox Lake	Macomb
Blue Island	Frankfort	Marion
Bourbonnais	Franklin Park	Markham
Bradley	Freeport	Matteson
Bridgeview	Galesburg	Mattoon
Brookfield	Geneva	Maywood
Buffalo Grove	Glen Carbon	Melrose Park
Burbank	Glendale Heights	Midlothian
Burr Ridge	Glen Ellyn	Minooka
Cahokia	Glenview	Mokena
Calumet City	Godfrey	Moline
Campton Hills	Granite City	Montgomery
Canton	Grayslake	Morris
Carbondale	Gurnee	Morton
Carol Stream	Hanover Park	Morton Grove
Carpentersville	Harvey	Mount Vernon
Cary	Hazel Crest	Mundelein
Centralia	Herrin	New Lenox
Channahon	Hickory Hills	Niles
Charleston	Highland Park	Norridge
Chatham	Hinsdale	North Aurora
Chicago Heights	Homer Glen	Northbrook
Chicago Ridge	Homewood	North Chicago
Collinsville	Huntley	Northlake
Country Club Hills	Jacksonville	Oak Forest
Crest Hill	Justice	O'Fallon
Crestwood	Kankakee	Oswego
Crystal Lake	Kewanee	Ottawa
Danville	La Grange	Palos Heights
Darien	La Grange Park	Palos Hills
Deerfield	Lake Forest	Park Forest
DeKalb	Lake in the Hills	Park Ridge
Dixon	Lake Zurich	Pekin
Dolton	Lansing	Peru
Downers Grove	Lemont	Plainfield
East Moline	Libertyville	Plano
East Peoria	Lincoln	Pontiac

Prospect Heights
Quincy
Rantoul
Richton Park
Riverdale
River Forest
River Grove
Rock Island
Rolling Meadows
Romeoville
Roscoe
Roselle
Round Lake
Round Lake Beach
St. Charles
Sauk Village
Schiller Park
Shiloh
Shorewood
South Elgin
South Holland
Sterling
Streamwood
Streator
Summit
Swansea
Sycamore
Taylorville
Urbana
Vernon Hills
Villa Park
Warrenville
Washington
Wauconda
Westchester
West Chicago
Western Springs
Westmont
Wheeling
Wilmette
Winnetka
Wood Dale
Woodridge
Wood River
Woodstock
Worth

Yorkville
Zion

Indiana

Auburn
Avon
Bedford
Beech Grove
Brownsburg
Cedar Lake
Chesterton
Clarksville
Columbus
Connersville
Crawfordsville
Crown Point
Dyer
East Chicago
Frankfort
Franklin
Goshen
Greencastle
Greenfield
Greensburg
Greenwood
Griffith
Highland
Hobart
Huntington
Jasper
Jeffersonville
Kokomo
Lake Station
La Porte
Lawrence
Lebanon
Logansport
Madison
Marion
Martinsville
Merrillville
Michigan City
Mishawaka
Munster
New Albany
New Castle
New Haven

Peru
Plainfield
Plymouth
Portage
Richmond
St. John
Schererville
Seymour
Shelbyville
Speedway
Valparaiso
Vincennes
Wabash
Warsaw
Washington
Westfield
West Lafayette
Zionsville

Kansas

Andover
Arkansas City
Atchison
Coffeyville
Derby
Dodge City
El Dorado
Emporia
Garden City
Gardner
Great Bend
Hays
Haysville
Hutchinson
Junction City
Lansing
Leavenworth
Leawood
Lenexa
Liberal
McPherson
Merriam
Newton
Ottawa
Parsons
Pittsburg
Prairie Village

Salina
Winfield

Kentucky
Bardstown
Berea
Covington
Danville
Elizabethtown
Erlanger
Florence
Fort Thomas
Frankfort
Georgetown
Glasgow
Henderson
Hopkinsville
Independence
Jeffersontown
Lawrenceburg
Lyndon
Madisonville
Mayfield
Middlesborough
Murray
Newport
Nicholasville
Paducah
Radcliff
Richmond
Shelbyville
Shepherdsville
Shively
Somerset
St. Matthews
Winchester

Louisiana
Abbeville
Alexandria
Baker
Bastrop
Bogalusa
Central
Crowley
Denham Springs
DeRidder
Eunice

Gretna
Hammond
Houma
Jennings
Mandeville
Minden
Monroe
Morgan City
Natchitoches
New Iberia
Opelousas
Pineville
Ruston
Slidell
Sulphur
Thibodaux
West Monroe
Zachary

Maryland
Aberdeen
Annapolis
Bel Air
Cambridge
College Park
Cumberland
Easton
Elkton
Greenbelt
Hagers
Havre de Grace
Hyattsville
Laurel
New Carrollton
Salisbury
Takoma Park
Westminster

Mississippi
Biloxi
Brandon
Brookhaven
Byram
Canton
Clarksdale
Cleveland
Clinton
Columbus

Corinth
Gautier
Greenville
Greenwood
Grenada
Hattiesburg
Hernando
Horn Lake
Indianola
Laurel
Long Beach
McComb
Madison
Meridian
Moss Point
Natchez
Ocean Springs
Olive Branch
Oxford
Pascagoula
Pearl
Petal
Picayune
Ridgeland
Southaven
Starkville
Tupelo
Vicksburg
West Point
Yazoo City

Missouri
Arnold
Ballwin
Bellefontaine
Neighbors
Belton
Bolivar
Branson
Bridgeton
Cape Girardeau
Carthage
Chesterfield
Clayton
Crestwood
Creve Coeur
Dardenne Prairie

Eureka
Excelsior Springs
Farmington
Ferguson
Festus
Fulton
Gladstone
Grain Valley
Grandview
Hannibal
Harrisonville
Hazelwood
Jackson
Jefferson City
Jennings
Kennett
Kirksville
Kirkwood
Lake St. Louis
Lebanon
Liberty
Manchester
Marshall
Maryland Heights
Maryville
Mexico
Moberly
Neosho
Nixa
Overland
Ozark
Poplar Bluff
Raymore
Raytown
Republic
Rolla
St. Ann
Sedalia
Sikeston
Town and Country
Troy
Union
University City
Warrensburg
Washington
Webb City

Webster Groves
Wentzville
West Plains
Wildwood

North Carolina
Albemarle
Apex
Archdale
Asheboro
Belmont
Boone
Burlington
Carrboro
Clayton
Clemmons village
Cornelius
Davidson
Eden
Elizabeth
Fuquay-Varina
Garner
Goldsboro
Graham
Harrisburg
Havelock
Henderson
Hendersonville
Hickory
Holly Springs
Hope Mills
Huntersville
Indian Trail
Kannapolis
Kernersville
Kings Mountain
Kinston
Knightdale
Laurinburg
Leland
Lenoir
Lewisville
Lexington
Lincolnton
Lumberton
Matthews
Mebane

Mint Hill
Monroe
Mooresville
Morganton
Morrisville
Mount Airy
Mount Holly
New Bern
Newton
Pinehurst
Reidsville
Roanoke Rapids
Salisbury
Sanford
Shelby
Smithfield
Southern Pines
Spring Lake
Stallings
Statesville
Summerfield
Tarboro
Thomasville
Wake Forest
Wilson

Ohio
Alliance
Amherst
Ashland
Ashtabula
Athens
Aurora
Avon
Avon Lake
Barberton
Bay Village
Beachwood
Beavercreek
Bedford
Bedford Heights
Bellefontaine
Berea
Bexley
Blue Ash
Bowling Green
Brecksville

Broadview Heights
Brooklyn
Brook Park
Brunswick
Bucyrus
Cambridge
Celina
Centerville
Chillicothe
Circleville
Clayton
Cleveland Heights
Conneaut
Coshocton
Cuyahoga Falls
Defiance
Delaware
Dover
Dublin
East Cleveland
Eastlake
East Liverpool
Englewood
Euclid
Fairborn
Fairfield
Fairview Park
Findlay
Forest Park
Fostoria
Franklin
Fremont
Gahanna
Galion
Garfield Heights
Green
Greenville
Grove City
Heath
Hilliard
Huber Heights
Hudson
Ironton
Kent
Lancaster
Lebanon

Lima
Loveland
Lyndhurst
Macedonia
Mansfield
Maple Heights
Marietta
Marion
Marysville
Mason
Massillon
Maumee
Mayfield Heights
Medina
Mentor
Miamisburg
Middleburg Heights
Middle
Monroe
Montgomery
Mount Vernon
Newark
New Franklin
New Philadelphia
Niles
North Canton
North Olmsted
North Ridgeville
North Royalton
Norton
Norwalk
Norwood
Oregon
Oxford
Painesville
Parma Heights
Pataskala
Perrysburg
Pickerington
Piqua
Portsmouth
Powell
Ravenna
Reading
Reynoldsburg
Richmond Heights

Riverside
Rocky River
Salem
Sandusky
Seven Hills
Shaker Heights
Sharonville
Sidney
Solon
South Euclid
Springboro
Springdale
Steubenville
Stow
Streetsboro
Strongsville
Struthers
Sylvania
Tallmadge
Tiffin
Trenton
Trotwood
Troy
Twinsburg
University Heights
Upper Arlington
Urbana
Vandalia
Van Wert
Vermilion
Wadsworth
Warren
Warrensville Heights
Washington Court
House
West Carrollton
Westerville
Westlake
Whitehall
Wickliffe
Willoughby
Willowick
Wilmington
Wooster
Worthington
Xenia

Zanesville

Oklahoma

Ada
Altus
Ardmore
Bartlesville
Bethany
Bixby
Chickasha
Choctaw
Claremore
Del City
Duncan
Durant
Elk City
El Reno
Enid
Glenpool
Guthrie
Guymon
Jenks
McAlester
Miami
Muskogee
Mustang
Okmulgee
Owasso
Ponca City
Sand Springs
Sapulpa
Shawnee
Stillwater
Tahlequah
Warr Acres
Weatherford
Woodward
Yukon

Pennsylvania

Altoona
Baldwin
Berwick
Bethel Park
municipality
Bloomsburg
Butler
Carlisle

Chambersburg
Chester
Coatesville
Columbia
Darby
Dunmore
Easton
Emmaus
Ephrata
Franklin Park
Greensburg
Hanover
Harrisburg
Hazleton
Hermitage
Indiana
Jefferson Hills
Johns
Kingston
Lansdale
Lansdowne
Lebanon
Lower Burrell
McKeesport
Meadville
Monroeville
municipality
Munhall
Murrysville
municipality
Nanticoke
New Castle
New Kensington
Norris
Oil City
Phoenixville
Plum
Potts
Pottsville
St. Marys
Sharon
State College
Union
Washington
Waynesboro
West Chester

West Mifflin
Whitehall
Wilkes-Barre
Wilkinsburg
Williamsport
Wyomissing
Yeadon
York

South Carolina

Aiken
Anderson
Beaufort
Bluffton
Cayce
Clemson
Conway
Easley
Florence
Forest Acres
Fort Mill
Gaffney
Goose Creek
Greenwood
Greer
Hanahan
Hilton Head Island
Irmo
Lexington
Mauldin
Myrtle Beach
Newberry
North Augusta
North Myrtle Beach
Orangeburg
Port Royal
Simpsonville
Spartanburg
Summerville
Sumter
West Columbia

Tennessee

Arlington
Athens
Brentwood
Bristol
Brownsville

105

Cleveland
Collierville
Columbia
Cookeville
Crossville
Dickson
Dyersburg
East Ridge
Elizabethton
Farragut
Gallatin
Germantown
Goodlettsville
Greeneville
Kingsport
Lakeland
La Vergne
Lawrenceburg
Lebanon
Lewisburg
McMinnville
Manchester
Martin
Maryville
Millington
Morristown
Mount Juliet
Oak Ridge
Paris
Portland
Red Bank
Sevierville
Shelbyville
Smyrna
Soddy-Daisy
Springfield
Spring Hill
Tullahoma
Union City
White House

Texas

Addison
Alamo
Alice
Alton
Alvin

Andrews
Angleton
Athens
Azle
Balch Springs
Bay City
Bedford
Beeville
Bellaire
Belton
Benbrook
Big Spring
Boerne
Bonham
Borger
Brenham
Brownwood
Burkburnett
Burleson
Canyon
Cedar Hill
Cedar Park
Cibolo
Cleburne
Clute
Colleyville
Converse
Coppell
Copperas Cove
Corinth
Corsicana
Crowley
Deer Park
Del Rio
Denison
DeSoto
Dickinson
Donna
Dumas
Duncanville
Eagle Pass
El Campo
Ennis
Farmers Branch
Forest Hill
Forney

Fredericksburg
Freeport
Friendswood
Gainesville
Galena Park
Galveston
Gatesville
Georgetown
Glenn Heights
Grapevine
Greenville
Groves
Haltom City
Harker Heights
Henderson
Hereford
Hewitt
Hidalgo
Highland Village
Horizon City
Humble
Huntsville
Hurst
Hutto
Jacinto City
Jacksonville
Katy
Keller
Kerrville
Kilgore
Kingsville
Kyle
Lake Jackson
Lakeway
La Marque
Lancaster
La Porte
Leander
Leon Valley
Levelland
Little Elm
Live Oak
Lockhart
Lufkin
Lumberton
Marshall

Mercedes
Midlothian
Mineral Wells
Mount Pleasant
Murphy
Nacogdoches
Nederland
Orange
Palestine
Pampa
Paris
Pflugerville
Plainview
Portland
Port Lavaca
Port Neches
Raymondville
Red Oak
Richmond
Rio Grande City
Robinson
Robstown
Rockwall
Rosenberg
Sachse
Saginaw
San Benito
San Juan
San Marcos
Santa Fe
Schertz
Seabrook
Seagoville
Seguin
Sherman

Snyder
Socorro
South Houston
Southlake
Stafford
Stephenville
Sulphur Springs
Sweetwater
Taylor
Terrell
Texarkana
Texas City
The Colony
Tomball
Universal City
University Park
Uvalde
Vernon
Vidor
Watauga
Waxahachie
Weatherford
Webster
Weslaco
West University Place
White Settlement
Wylie

Virginia
Blacksburg
Bristol
Charlottesville
Christiansburg
Colonial Heights
Culpeper
Danville

Fairfax
Falls Church
Fredericksburg
Front Royal
Harrisonburg
Herndon
Hopewell
Leesburg
Manassas
Manassas Park
Martinsville
Petersburg
Poquoson
Radford
Salem
Staunton
Vienna
Waynesboro
Williamsburg
Winchester

West Virginia
Beckley
Bluefield
Clarksburg
Fairmont
Huntington
Martinsburg
Morgan
Parkersburg
St. Albans
South Charleston
Vienna
Weirton
Wheeling

APPENDIX B:

Survey

Demographic and Structural Data
1. What is the current population of your city?
2. Does your city have a formal strategic plan for IT?
3. Do you report directly to the chief executive officer of your organization (potentially the mayor or city manager depending on local government structure)?
4. Are you part of the organization's top management team? (***To include a "UNSURE" option)***
5. If you do not report to the organization's CEO, how many levels of the organization exist between the CEO and your position? For example, if you report to the chief financial officer who then reports to the CEO, you would report 2 levels.
6. How many employees are in the IT department?
7. What is the current IT budget for FY 2014?
8. What is the total city budget for FY 2014?
9. What percentage of the IT function is outsourced? (0 – 100)
10. Would you consider the IT function to be centralized or decentralized? ***To include a "UNSURE" option)***

Likert-type scale to measure IT leader's perception of strategic alignment.
11. Please rate the following based upon your perceptions as the senior IT leader (1-Strongly Disagree, 2-Disagree, 3-Agree, 4-Strongly Agree)
    a. I participate fully in the organization's strategic planning.
    b. I am a full partner in the organization's budget process.
    c. I am knowledgeable about the all the processes and requirements external to IT in achieving the organization's strategic goals.
    d. The organizational leadership understands the ability and proper role of IT and IT leadership in achieving the organization's strategic goals.
    e. I only interact with the top management team formally through meetings and official communications.
    f. My work experience is similar to that of others in the organization.
    g. I have the opportunity to educate and/or manage the expectations of leadership about what IT can and cannot do effectively in pursuit of the organization's strategic goals.
    h. IT is properly placed within the organization to be most effective in helping the organization achieve its strategic goals.
    i. Cost and efficiency are usually the primary concerns of leadership when implementing new IT systems.
    j. Organizational leadership regularly consults with me on how best to leverage IT in meeting strategic goals.

Questions below consider issues of actual alignment and will be scored as dummy variables (Yes or No) to create an overall score.
12. Consider the most recent significant IT project undertaken by the organization.

a. Was the project driven by the top management team (top–down) or was it driven by the IT function (bottom-up)?
b. Was there an organizational champion outside of IT?
c. Was it generated as part of the strategic planning process?
d. If so, were you consulted as part of the strategic planning process?
e. Was the project provided sufficient schedule time by the top management team?
f. Was there a specific budget created for project?
g. Was the project successful in regards to:
    i. Time
    ii. Budget
    iii. Implementation (Were the benefits to the organization realized?)

13. Outsourcing
a. Has the organization outsourced a significant (more than 10%) of the IT function?
b. Was this initiative driven largely by (check all that apply):
    i. Cost savings to the overall organization to include reduction in IT staff.
    ii. Augmenting skills and abilities not present in current staff.
    iii. Providing additional services and efficiencies to constituents.
c. Would you consider this a bottom-up initiative from your perspective?
d. Was the outsourcing initiative successful?
e. On future outsourcing:
    i. It is likely to happen regardless of my opinion.
    ii. It will be a benefit to the organization.

14. F/OSS
a. Has the organization initiated an F/OSS project?
b. Was this a top-down initiative?
c. Was this driven by:
    i. Lower Cost
    ii. Increased functionality (including more secure software)
d. Was IT given the proper time to investigate solutions and make recommendations to the top management team?
e. Was IT given opportunity to educate the top management team about the benefits and issues of F/OSS?

15. Information Security
a. Does the organization have a formal information security function?
b. Does the information security function report through the IT function (i.e. the ISO reports to the CIO)?
c. Does the top management team regularly consult the ISO, regardless of reporting structure, on issues concerning information security?
d. Does the ISO, regardless of reporting structure, have opportunity to educate the top management team on issues concerning information security?
e. Has a formal SETA (security education, training, and awareness) program been put into place within the organization?

Optional Section
16. Number of years employed in your current role.
17. Formal training or education in IT/IS?
18. Formal training or education in business or administration?
19. Salary (optional)

APPENDIX C:

Institutional Research Board Protocol Exemption Report

APPENDIX C:

Institutional Research Board Protocol Exemption Report

Institutional Review Board (IRB)
for the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

PROTOCOL NUMBER:	IRB-03228-2015	**INVESTIGATOR:**	**Howard Dunn**
PROJECT TITLE:	Factors Influencing IT Leadership Perceptions of Strategic Alignment in Small City Governments		

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **exempt** from Institutional Review Board oversight under Exemption Category(ies) 3. You may begin your study immediately. If the nature of the research project changes such that exemption criteria may no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research.

ADDITIONAL COMMENTS/SUGGESTIONS:

Although not a requirement for exemption, the following suggestions are offered by the IRB Administrator to enhance the protection of participants and/or strengthen the research proposal:

NONE

☐ If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.

Elizabeth W. Olphie   *06/19/2015*

Elizabeth W. Olphie, IRB Administrator   Date

Thank you for submitting an IRB application.
Please direct questions to irb@valdosta.edu or 229-259-5045.

Revised: 12.13.12

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APPENDIX D:

Introductory Email

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Introductory Email

Greetings Information Technology Leader,

I am contacting you to participate in a survey for a research project entitled "Factors Influencing IT Leadership Perceptions of Strategic Alignment in Small City Governments," which I am conducting as a doctoral candidate at Valdosta State University. The survey is intended to analyze perceptions of IT strategic alignment within small city governments. For this study, a small city is one having a population of less than 50 thousand. Completing the survey is expected to require no more than 30 minutes. The survey will open one week from receipt of this email and will remain open for 8 weeks. A follow up email will remind you of the opening of the survey. Weekly reminders will be sent to help maximize the response rate. Please note that you will receive no further reminders upon completing the survey.

This survey is anonymous. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to take the survey, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.

Questions regarding the purpose or procedures of the research should be directed to Scott Dunn at hsdunn@valdosta.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-259-5045 or irb@valdosta.edu.

Thank you in advance for your participation.

Sincerely,
H. Scott Dunn

APPENDIX E:

Follow-up Email

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Follow-up Email

Greetings Information Technology Leader,

I recently emailed you to ask that you participate in a survey. This survey is a critical piece of the research I am conducting to complete my doctoral dissertation in Public Administration at Valdosta State University. The survey should require no more than 30 minutes of your time and will remain open for 8 weeks from your receipt of this email.

The survey is open today and may be accessed at:
<<insert link for survey>>

Or copy and paste the URL below into your internet browser:
<<Provide text link>>

This survey is anonymous. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to take the survey, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.

Questions regarding the purpose or procedures of the research should be directed to Scott Dunn at hsdunn@valdosta.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-259-5045 or irb@valdosta.edu.

Thank you in advance for your participation.

Sincerely,
H. Scott Dunn

APPENDIX F:

Weekly Notice Email

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Weekly Notice Email

Greetings Information Technology Leader,

Recently, you were asked to participate in an anonymous survey for a research project entitled "Factors Influencing IT Leadership Perceptions of Strategic Alignment in Small City Governments," a study conducted by Scott Dunn, a doctoral candidate at Valdosta State University.

Strategic alignment is a critical aspect in ensuring that technology is properly utilized by organizations in serving their constituents. Your response to this survey will better explain how strategic alignment is perceived by senior IT leadership in smaller city governments throughout the southeast.

If you are one of the many participants who have already responded, thank you for your prompt participation. If you have not, please invest less than thirty minutes to register your response soon. Only a few days remain before the survey closes.

Take the Survey
<<insert link>>
or copy and paste this link into your browser:
<<Provide text link>>

Again, thank you for your assistance. Please contact me at hsdunn@valdosta.edu if you have any questions.

Sincerely,

H. Scott Dunn

APPENDIX G:

Final Email

APPENDIX G:

Final Email

Greetings Information Technology Leader:

Recently, you were asked to participate in an anonymous survey for a research project entitled "Factors Influencing IT Leadership Perceptions of Strategic Alignment in Small City Governments," a study conducted by Scott Dunn, a doctoral candidate at Valdosta State University.

If you have already participated, thank you for your time. If you have not, please register your responses today before the survey closes. Your response is important to the understanding of strategic alignment and its perception by IT leadership
.
Follow this link to the Survey:
<<insert link>>
Or copy and paste the URL below into your internet browser:

<<Provide text link>>

Again, thank you for your assistance. Please contact me at hsdunn@valdosta.edu if you have any questions.

Sincerely,

H. Scott Dunn

APPENDIX H:

Reliability and Validity Tests

APPENDIX H:

Reliability and Validity Tests
Tests of reliability and validity for Likert scale measuring the senior IT leader's

perception of IT strategic alignment within the organization.

Cronbach's alpha

raw alpha	0.75
std. alpha	0.74
G6(smc)	0.82
average r	0.22
S/N	2.8
ase	.047
mean	2.8
SD	0.46

Kaiser-Meyer-Olkin Measure of Sampling Adequacy
Overall MSA = 0.76
MSA for each item =

L1	0.77
L2	0.67
L3	0.86
L4	0.83
L5r	0.46
L6	0.61
L7	0.88
L8	0.78
L9r	0.65
L10	0.83

Bartlett Test of Sphericity

Bartlett's K-squared = 18.559, df = 9, p-value = 0.02922

Split Half Reliabilities

|	
Maximum split half reliability (lambda 4)	= 0.9
Guttman lambda 6	= 0.85
Average split half reliability	= 0.8
Guttman lambda 3 (alpha)	= 0.8
Minimum split half reliability (beta)	= 0.68

APPENDIX I:

Correlation Matrix

Correlation Matrix

Significant Correlations among Study Variables
($P < 0.05$)

pop	Reported Population
crep	Direct CEO Report
tmt	Member of top management team
itb	IT budget
cb	City budget
cent	IT is centralized
l1-l10	Likert Scale
opsa	Overall perception of Strategic Alignment
pmsum	Project Management Indicator Sum
ossum	Outsourced Indicator Sum
fosum	Free/Open Source Indicator Sum
issum	Information Security Indicator Sum
oaas	Overall Actual Alignment Score
yemp	Years employed
itrain	Has had formal IT training
btrain	Has had formal business/admin training
sal	Reported Salary
Distom	Distance to nearest MSA
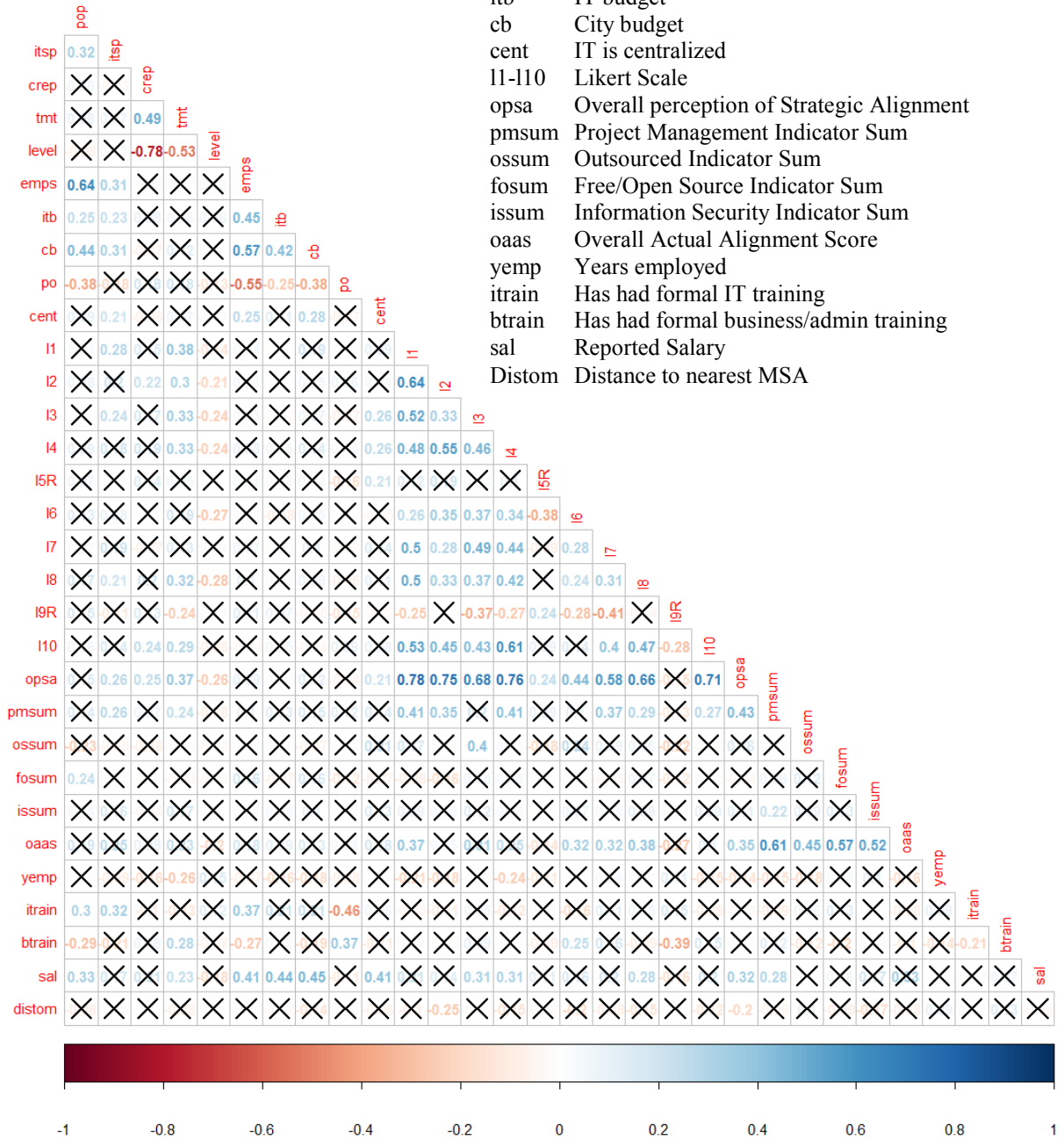
APPENDIX J:

Alternate Linear Model

APPENDIX J:

Alternate Linear Model

If we consider the linear model with the IT leader's perception of IT strategic

alignment as the dependent variable, originally presented in Chapter 3,

$OPSA=b_0+b_1*CPop+b_2*YEmp+b_3*ITTrain+b_4*BTrain+b_5*DRep+b_6*MTMT+b_7*ITEmp+b_8*ITBudget+b_9*Pout+b_{10}*ITCent$

It was found in the analysis to not provide significant explanatory power among any of

the independent variables.

However, utilization of the *leaps* package in R allows us to examine modes that

better fit the dependent variable OPSA. When calling *leaps::regsubsets* on the above

model (setting it to use all variables at a maximum) we find:

```
Subset selection object
Call: regsubsets.formula(opsa.formula.orig, obs.good, nvmax = 10)
10 Variables  (and intercept)
        Forced in Forced out
pop         FALSE       FALSE
yemp        FALSE       FALSE
itrain      FALSE       FALSE
btrain      FALSE       FALSE
crep        FALSE       FALSE
tmt         FALSE       FALSE
emps        FALSE       FALSE
itb         FALSE       FALSE
po          FALSE       FALSE
cent        FALSE       FALSE
1 subsets of each size up to 10
Selection Algorithm: exhaustive
         pop yemp itrain btrain crep tmt emps itb po  cent
1  ( 1 ) " " " "  " "    " "    " "  " " "*"  " " " " " "
2  ( 1 ) "*" " "  " "    " "    " "  " " "*"  " " " " " "
3  ( 1 ) "*" " "  "*"    " "    " "  " " "*"  " " " " " "
4  ( 1 ) "*" " "  "*"    " "    " "  " " "*"  " " "*" " "
5  ( 1 ) "*" " "  "*"    " "    " "  " " "*"  " " "*" "*"
6  ( 1 ) "*" " "  "*"    " "    " "  " " "*"  "*" " " "*" "*"
7  ( 1 ) "*" "*"  "*"    " "    " "  " " "*"  "*" " " "*" "*"
8  ( 1 ) "*" "*"  "*"    " "    "*"  " " "*"  "*" " " "*" "*"
9  ( 1 ) "*" "*"  "*"    " "    "*"  " " "*"  "*"  "*" "*" "*"
```

As noted from the above summary output, tmt (Top Management Team inclusion variable) is included in every model suggested by the process. Where each model is the best model for the number of included variables (far left column). Again, models are select on their ability to minimize the Bayesian Information Criterion (bic). This is illustrated in the following plot of the summary.
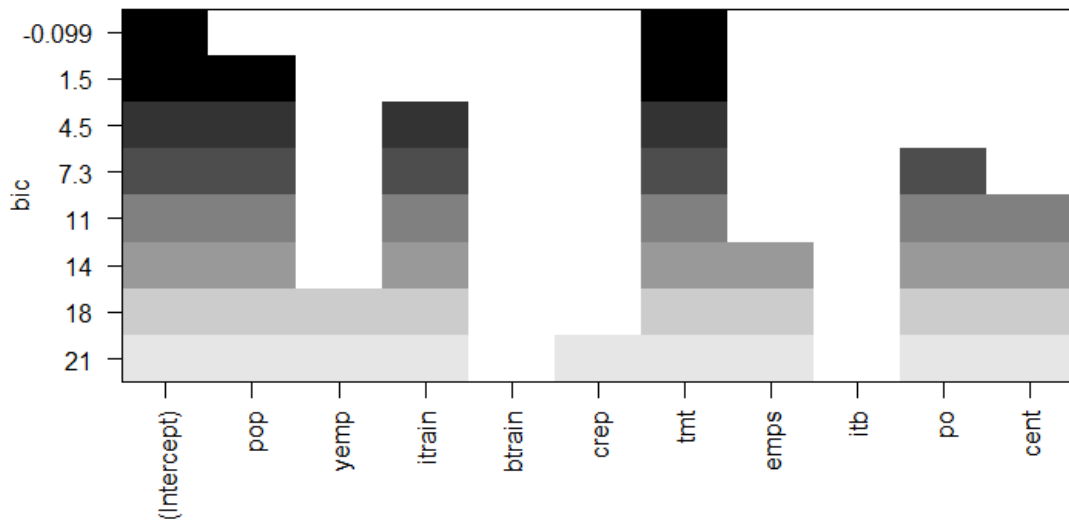
The model with the smallest bic would be:

$$OPSA = b_0 + b_1 * MTMT$$

More interesting, however, is that top management team membership appears in every "best of" model selected by the *leaps.regsubsets* package. This further supports the findings and discussion of Chapters 4 and 5.