

## Association for Information Systems AIS Electronic Library (AISeL)

---

ECIS 2015 Completed Research Papers

ECIS 2015 Proceedings

---

Spring 5-29-2015

# How Managers and Workers See Their World: Perceptions of the Relationship Between Organizational Capabilities and Absorptive Capacity in U.S. State Information Systems Departments

Deborah J. Armstrong

*Florida State University*, [djarmstrong@cob.fsu.edu](mailto:djarmstrong@cob.fsu.edu)

Cindy K. Riemenschneider

*Baylor University*, [C\\_Riemenschneider@baylor.edu](mailto:C_Riemenschneider@baylor.edu)

Yi Jack Liu

*Florida State University*, [yl13@my.fsu.edu](mailto:yl13@my.fsu.edu)

Follow this and additional works at: [http://aisel.aisnet.org/ecis2015\\_cr](http://aisel.aisnet.org/ecis2015_cr)

---

### Recommended Citation

Armstrong, Deborah J.; Riemenschneider, Cindy K.; and Liu, Yi Jack, "How Managers and Workers See Their World: Perceptions of the Relationship Between Organizational Capabilities and Absorptive Capacity in U.S. State Information Systems Departments" (2015). *ECIS 2015 Completed Research Papers*. Paper 11.

ISBN 978-3-00-050284-2

[http://aisel.aisnet.org/ecis2015\\_cr/11](http://aisel.aisnet.org/ecis2015_cr/11)

This material is brought to you by the ECIS 2015 Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2015 Completed Research Papers by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# HOW MANAGERS AND WORKERS SEE THEIR WORLD: PERCEPTIONS OF THE RELATIONSHIP BETWEEN ORGANIZATIONAL CAPABILITIES AND ABSORPTIVE CAPACITY IN U.S. STATE INFORMATION SYSTEMS DEPARTMENTS

*Complete Research*

Armstrong, Deborah J., Florida State University, Tallahassee, FL, USA,  
djarmstrong@business.fsu.edu

Liu, Yi, Florida State University, Tallahassee, FL, USA, yl13@my.fsu.edu

Riemenschneider, Cynthia, K., Baylor University, Waco, TX, USA,  
c\_riemenschneider@baylor.edu

## **Abstract**

*Despite the recognition that information is a strategic asset to any state government, there is a relative dearth of research on the information systems (IS) function in state government. This stands in contrast to the number of articles devoted to e-government initiatives. IS departments however are central to state agencies' efforts to develop optimal responses to demands from their internal and external constituents. The authors examine the connections between perceptions of critical agency capabilities (socialization, coordination, and systems) and the absorptive capacity of state IS departments from the perspective of IS workers and IS managers. Findings indicate that two critical capabilities (socialization and coordination) explained 62.5% of the variation in absorptive capacity for IS workers and 47% of the variation for IS managers. In addition, the influence of the relevant knowledge of IS workers and managers is found to have differing influences on agency capabilities.*

*Keywords: United States State Information Systems Departments, Organizational Capabilities, Knowledge, Absorptive Capacity.*

## **1 Introduction**

On the one hand the public sector economy continues to grow in both size and its influence on the United States (U.S.) economy as a whole (Pang, Tafti, and Krishnan, 2014); but on the other hand state budgets in the U.S. continue to be tight in the aftermath of the recent recession (Rich, 2011; Tolbert, Mossberger, and McNeal, 2008). Each state government is free to organize its departments and agencies in any way, the result of which is substantial diversity among the states organizational forms. Information technology (IT) spending in state governments has recently been found to influence cost efficiencies and value creation (Pang, Tafti, and Krishnan, 2014) indicating that information systems have become critical to a state's ability to innovate and respond to citizen and legislative demands for information (Harvey, Skelcher, Spencer, Jas, and Walshe, 2010) and services. To meet these demands and tackle issues such as cybersecurity, the implementation of the Affordable Care Act, and higher education expenses state government information systems (IS) continue to grow in complexity and across jurisdictional boundaries (e.g., Janairo, 2000; National Academy of Public Administration, 2001).

To address the demands of increased complexity and interoperability, state government IS personnel need to gather information about available technologies and develop innovative solutions. The challenge for public sector IS personnel is that much of the knowledge they will reference has been generated outside the public sector and will need to be transformed for use in their environment. So how do state government IS personnel gather the information needed to meet this challenge and innovate?

Absorptive capacity is the ability to recognize the value of new information, assimilate it, and use it for organizational purposes (Cohen and Levinthal, 1990; Zahra and George, 2002), and is viewed as an important antecedent of innovation (Cohen and Levinthal, 1989; 1990; Jansen, Van den Bosch, and Volberda, 2005; Todorova and Durisin, 2007; Van den Bosch, Volberda, and de Boer, 1999; Zahra and George, 2002). The public sector provides a unique environment within which to study absorptive capacity. To make knowledge suitable to address public policy questions and public decision making processes it must be transformed to meet the needs of highly diverse service environments (Yang and Melitski, 2007). In addition, the ability to take risks is curtailed in the public sector because of constitutional and legal constraints as well as the potential of doing harm (Berman and West, 1998).

Previous studies have argued that prior knowledge influences organizational capabilities, which are antecedents of absorptive capacity (Jansen, Van den Bosch, and Volberda, 2005; Zahra and George, 2002). But research has yet to systematically explore the role that organizational capabilities might have in the absorptive capacity process for state government IS departments, or the potentially differing perspectives of various groups within the IS department. Thus, we seek to address the following research questions:

*RQ1: To what extent do perceived organizational and human capabilities influence the degree of absorptive capacity in state IS departments?*

*RQ2: To what extent are the perceptions of the influence of organizational and human capabilities on the degree of absorptive capacity in state IS departments consistent for IS managers and IS workers?*

As Moore (2005, p. 43) states, "...to remain efficient, effective, and responsive, government managers would have to innovate." In the current environment an efficient, effective, and responsive state government necessitates e-government initiatives, and innovation is a key contributor to the success of e-government initiatives (Bekkers and Homburg, 2005; Scherlis and Eisenberg, 2003; Tolbert, Mossberger, and McNeal, 2008). At the core of successful e-government initiatives is an innovative IS department. As such, more research is needed to uncover the mechanisms that may lead to increased absorptive capacity (and ultimately innovation), particularly for state government IS departments.

## **2 Literature Review and Hypothesis Development**

### **2.1 Absorptive Capacity**

Cohen and Levinthal argue that developing absorptive capacity and developing innovations are dependent activities. They also assert that absorptive capacity is a function of firm's level of prior related knowledge, and that this knowledge is critical to a firm's innovative capability (Cohen and Levinthal, 1989; 1990).

### **2.2 Organizational Capabilities and Absorptive Capacity**

Kogut and Zander (1992) defined organizational capabilities as "...the intersection of the capability of the firm to exploit its knowledge and the unexplored potential of the technology" (p. 19). Organizational capabilities (socialization, coordination and systems) enable organizations (and/or departments) to integrate extant knowledge with newly acquired external information and knowledge (Kogut and Zander, 1992; Van den Bosch, Volberda, and de Boer, 1999; Eisenhardt and Martin, 2000).

We assert that higher absorptive capacity is more likely to occur when state agency IS departments have certain organizational processes and human capabilities in place. We believe the organizational

processes that promote innovation (e.g., looking for a better way of performing existing processes), and developing more efficient and effective processes are more likely to influence absorptive capacity than organizational processes that are stagnant. In the private sector, Kane and Alavi (2007) find that IT-enabled learning, which refers to both the technologies and organizational capabilities related to these technologies, can help organizations respond to their environment, and increase organizational learning abilities. Thus, organizational capabilities are extremely important precursors to an agency’s ability to absorb knowledge (Kogut and Zander, 1992). Each hypothesis is developed next, and all of the hypothesized relationships are graphically represented in Figure 1.

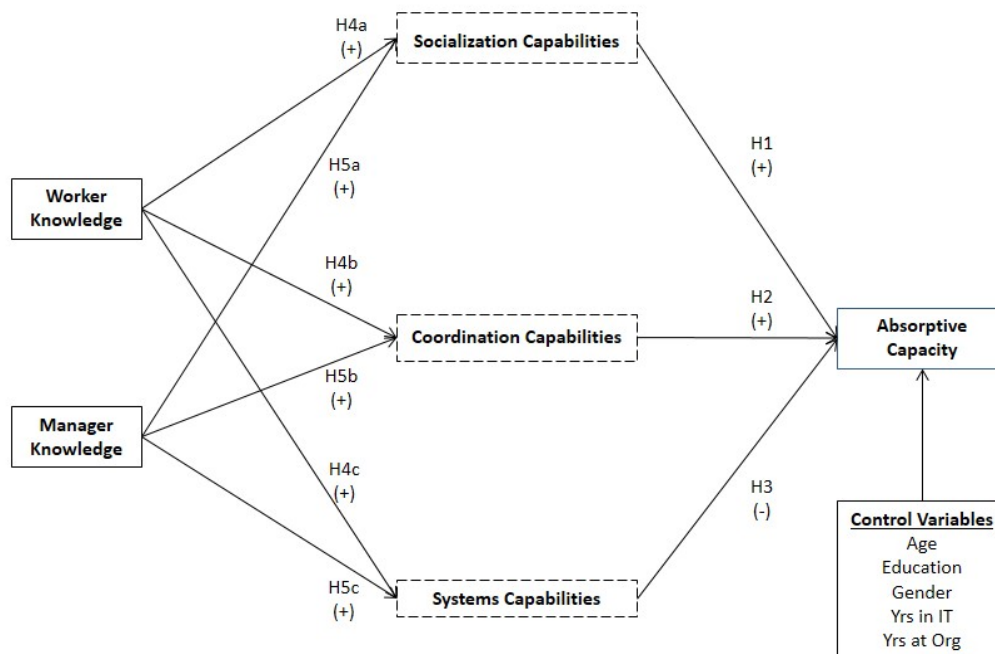


Figure 1. Antecedents of absorptive capacity.

### 2.2.1 Socialization Capabilities

Socialization capabilities refer to “the ability of the firm to produce a shared ideology that offers members an attractive identity as well as collective interpretations of reality” (Van den Bosch, Volberda, and de Boer, 1999, p. 557). Jansen, Van den Bosch, and Volberda (2005) found that “Socialization capabilities create broad, tacitly understood rules for appropriate action ... and exhibit two commonalities: connectedness and socialization” (p. 1009) and that “socialization tactics lead to strong social norms and beliefs” (p. 1003). Socialization measures the extent to which the IS department has strong, understandable, manager-supported, and widely shared values. Socialization can be used to ensure that individuals are connected to the broader state IS department goals.

The degree to which the agency is perceived to create and communicate clear objectives and performance expectations so individuals understand their roles in light of the mission of the agency (Rainey, 2003; Van der Post, de Coning, and Smit, 1997) is an important component of an agency’s socialization tactics. The literature focused on the public sector has noted the difficulties of agencies to clearly

define goals and make independent decisions because of the contingent nature of public agency environment (e.g., Stazyk and Goerdel, 2011). In situations where the IS department goals are perceived as more clear, it is more likely that individuals will be focused on identifying ways to help the agency address its goals. Therefore, we propose the following:

*H1: Perceived socialization capabilities will positively influence absorptive capacity in state IS departments.*

## **2.2.2 Coordination Capabilities**

Knowledge sharing has been a perennial problem for public agencies, especially in the technology and social services fields (e.g., subsidized housing, food and medical care programs), where collaboration is deemed most beneficial (Berry, Krutz, Langner, and Budetti, 2008; Gil-Garcia, Chengalur-Smith, and Duchessi, 2007). To be effective, information and knowledge acquired from the environment must be disseminated to relevant departments and individuals (Van den Bosch, Volberda, and de Boer, 1999). Coordination capabilities “enhance knowledge absorption through relations between members of a group” (Van den Bosch, Volberda, and de Boer, 1999, p. 556).

Coordination capabilities can help the IS department’s work units effectively synchronize and manage resource and task dependences to create and implement new ways of doing things (Pavlou and El Sawy, 2006). Lateral coordination, as typically occurs within teams, is said to improve knowledge sharing (Willem and Buelens, 2007). We assert that coordination involves ensuring that the work output is useful to others, seeing that resources are allocated appropriately, matching individual expertise and knowledge to the task, and ensuring individuals coordinate their work tasks in an optimal manner. Since coordination can assist the IS department in more effectively utilizing resources and sharing knowledge, we also assert that these activities may positively influence an individual’s ability to identify and absorb new information and knowledge useful to the IS department and agency. Therefore, we propose the following:

*H2: Perceived coordination capabilities will positively influence absorptive capacity in state IS departments.*

## **2.2.3 Systems Capabilities**

Systems capabilities are the third of the capabilities identified by Van den Bosch, Volberda, and de Boer (1999) and are used to integrate knowledge and “provide a memory for handling routine situations” in that “they eliminate the need for further communication and coordination among subunits and positions” (Van den Bosch, Volberda, and de Boer, 1999, p. 556). Examples of such processes include procedures, policies, or manuals designed to routinize communication within the IS department. However, since technology frequently changes, existing processes must constantly be challenged. Therefore, in IS departments where there is a high reliance on formal rules and/or procedures, individuals may feel less motivated or perceive they do not have the freedom to engage in knowledge scanning and knowledge integration. Thus we hypothesize the following:

*H3: Perceived systems capabilities that rely heavily on routines will negatively influence absorptive capacity in state IS departments.*

## **2.3 The Relationship between Prior Knowledge and Organizational Capabilities**

While absorptive capacity has been primarily used to explain firm level phenomenon, a firm’s absorptive capacity depends on the absorptive capacities of its individual members; and accumulated prior knowledge increases both the ability to put new knowledge into memory, and the ability to recall and use it (Cohen and Levinthal, 1990). Related to this, researchers have begun to explore the perceived micro-level antecedents of absorptive capacity (e.g., Ojo, Raman, Chong, and Chong, 2014), and

demonstrate the applicability of absorptive capacity from the group and/or team perspective (e.g., Leal-Rodriguez, Roldan, Ariza-Montes, and Leal-Millan, 2014; Mesko, and Kor, 2013).

A firm's absorptive capacity is comprised of the knowledge of the employees as well as the skill and motivation of the employees to share their knowledge with others in the IS department and agency. Individuals who possess prior relevant knowledge are better equipped to identify useful external information and integrate it in creative ways into their existing knowledge schemas. The presence of technology skills and the understanding of management practices by both managers and workers are important and distinct components of prior relevant knowledge (Tu, Vonderembse, Ragu-Nathan, and Sharkey, 2006). Manager knowledge is defined as the "understanding of job skills, technology and practices possessed by managers in the organization" (Tu, Vonderembse, Ragu-Nathan, and Sharkey, 2006, p. 695), while worker knowledge is defined in the same way except applied to non-managerial workers. We expect that the more relevant knowledge that individuals perceive they possess, the greater the socialization, coordination, and system capabilities. We hypothesize the following:

*H4: Perceived worker knowledge will be positively related to (H4a) socialization capabilities, (H4b) coordination capabilities and (H4c) systems capabilities.*

*H5: Perceived manager knowledge will be positively related to (H5a) socialization capabilities, (H5b) coordination capabilities and (H5c) systems capabilities.*

### **3 Method**

In building our model we draw on the perceptions of personnel working in state IS departments regarding potential antecedents of absorptive capacity that are applicable in their state governments. U.S. State government agencies provide a unique context for this study. IS departments within U.S. state agencies face an environment in which changes in legislative and policy objectives are constant, and the pay inequities compared to the private sector often make it hard to recruit and retain talent. Government bureaucracy, on the other hand, creates an environment that has stringent rules and procedures that can make it hard to react swiftly in the face of rapid technological and process change (Singer, 1995).

#### **3.1 Participants**

The sample for this study consisted of 417 IS workers representing 21 different states (42% response rate based on 50 states), and 102 IS managers representing 14 states (28% response rate). The names and e-mail addresses of the state CIOs were obtained from the National Association of State Chief Information Officers (NASCIO) headquarters, the premier organization which provides support to state CIOs through information exchange of IS best practices and innovations. The Executive Director of NASCIO contacted the state CIOs by e-mail, giving them the URL for the survey website and encouraged them to complete the survey. Each state CIO was then asked to distribute the URL for the survey website to his/her IS personnel.

We conducted an analysis of the responder versus non-responder states and found no significant differences in terms of the regions within the United States (sample included 6 states from the Midwest, 4 from the Northeast, 4 from the Southeast, 2 from the Southwest, and 5 from the West) or the state's 'grade' (sample included 1-A, 10-B, 9-C, 1-D) on the Government Performance Project's Grading the States 2008 Report (Barrett and Greene, 2008) in which grades of A, A-, B+, B, B-, etc. are given to each state (see [www.pewcenteronthestates.org](http://www.pewcenteronthestates.org)). We included education, age, gender, organizational tenure and tenure in the profession as control variables for absorptive capacity. A common control variable in the information systems literature is industry. As all participants in this study were members of a state IS department, there was a natural control for industry. The demographics for the participants are shown in Table 1.

| Concept                      | Values              | Frequency/Statistics<br>IS Workers | Frequency/Statistics IS<br>Managers |
|------------------------------|---------------------|------------------------------------|-------------------------------------|
| Gender                       | Male                | 152                                | 31                                  |
|                              | Female              | 214                                | 61                                  |
|                              | Did Not Report      | 51                                 | 10                                  |
| Age                          |                     | M = 46.33, SD = 9.52               | M = 43.04, SD = 18.40               |
| Marital Status               | Single              | 109                                | 14                                  |
|                              | Married             | 257                                | 77                                  |
|                              | Did Not Report      | 51                                 | 11                                  |
| Level of Edu-<br>cation      | High School Diploma | 61                                 | 5                                   |
|                              | Associate Degree    | 80                                 | 12                                  |
|                              | Bachelor Degree     | 168                                | 50                                  |
|                              | Graduate Degree     | 58                                 | 25                                  |
|                              | Did Not Report      | 50                                 | 10                                  |
| Years in organization        |                     | M = 11.19, SD = 8.77               | M = 12.84, SD = 10.54               |
| Years of IS experience       |                     | M = 16.62, SD = 9.94               | M = 19.12, SD = 11.99               |
| Years in current job         |                     | M = 8.30, SD = 6.93                | M = 6.75, SD = 6.59                 |
| Annual Salary                | Below \$25,000      | 4                                  | 2                                   |
|                              | \$25,000-\$39,999   | 62                                 | 0                                   |
|                              | \$40,000-\$54,999   | 159                                | 10                                  |
|                              | \$55,000-\$69,999   | 83                                 | 29                                  |
|                              | \$70,000-\$84,999   | 36                                 | 32                                  |
|                              | \$85,000-\$99,999   | 15                                 | 16                                  |
|                              | \$100,000 or above  | 6                                  | 4                                   |
|                              | Did Not Report      | 52                                 | 9                                   |
| Formal degree<br>in IS major | Yes                 | 184                                | 53                                  |
|                              | No                  | 182                                | 40                                  |
|                              | Did Not Report      | 51                                 | 9                                   |

Table 1. Descriptive statistics for demographic variables.

### 3.2 Measures

All survey items (sample items shown in Appendix) came from previously validated scales, and were adapted to the U.S. state government IS department context. While several scholars have measured systems capabilities (e.g., Van den Bosch, Volberda, and de Boer, 1999; Jansen, Van den Bosch, and Volberda, 2005) we did not feel those operationalizations were appropriate given our interest in measuring how IS personnel perceived their IS department. We conducted an extensive review of the literature that specifically focused on rules and close supervision of personnel. A pool of items was drawn primarily from Van der Post, de Coning, and Smit (1997) and Deshpande and Zaltman (1982). The authors reviewed the items and adapted them to the context, which resulted in a nine-item perceived systems capabilities scale. Our participants were asked to complete an on-line survey. The authors pre-tested the on-line instrument to be sure the electronic entry worked correctly. Responses were recorded using a 7-point Likert-type scale (1 = strongly disagree, 7 = strongly agree).

### 3.3 Data Validation

The data was analyzed using SmartPLS Version 2.0 (Ringle, Wende, and Will, 2005) following the guidelines outlined by Chin (1998). SmartPLS was chosen because it is well-suited for analyzing a variety of stages of dependent and independent variables and is appropriate for exploratory research since it shares the same sample size and distribution requirements as ordinary least squares regression (Gefen, Rigdon, and Straub, 2011).

This study analyzed a model with six constructs using a sample of 417/102 respondents and meets the recommended sample size requirement. Construct validity is assessed by using nomological, convergent, and discriminant validity. Nomological validity was assessed by using validated scales for all but one of the constructs; as previously noted. Convergent validity was assessed using factor loadings, composite reliability (CR), the average variance extracted (AVE), and Cronbach's alpha.

The factor loadings and cross loadings were analysed, and all loadings were greater than .70 (both samples) as recommended by Hair, Black, Babin, Anderson, and Tatham (2006), indicating appropriate convergence of the items to their factors. In order to ensure there were no issues with multicollinearity, the variance inflation factor (VIF) values for all of the constructs were calculated and found to be well below the threshold of 10.0 (Neter, Wasserman, and Kutner, 1990) (range = 1.12 - 2.67 for workers, 1.08-1.90 for managers). We also analyzed the data for outliers and none were found. Table 2 provides the mean, standard deviation, average variance extracted, composite reliability, and Cronbach's alpha for each of the constructs in both samples. Each construct had a Cronbach's alpha and composite reliability greater than .7 as recommended by Fornell and Larcker (1981), as well as an average variance extracted greater than .5 as recommended by Chin (1998). Discriminant validity can be assessed by comparing the square root of the AVE to the correlations (Chin, 1998). Table 3 shows the correlations with the square root of the AVE on the diagonal for both samples. The square root of the AVE is larger for each construct than any of the corresponding factor correlations, illustrating the discriminant validity of the constructs (Chin, 1998).

|                          | Mean<br>1-7 Scale | Standard<br>Deviation | AVE  | Composite<br>Reliability | Cronbachs Alpha |
|--------------------------|-------------------|-----------------------|------|--------------------------|-----------------|
| Absorptive Capacity      | 3.96              | 1.39                  | 0.80 | 0.98                     | 0.97            |
| Coordination Capability  | 4.22              | 0.93                  | 0.83 | 0.98                     | 0.97            |
| Manager Knowledge        | 4.40              | 1.52                  | 0.85 | 0.96                     | 0.94            |
| Socialization Capability | 3.62              | 1.43                  | 0.77 | 0.91                     | 0.89            |
| Systems Capability       | 4.71              | 1.07                  | 0.59 | 0.85                     | 0.78            |
| Worker Knowledge         | 4.84              | 1.38                  | 0.84 | 0.96                     | 0.94            |

Table 2a. Descriptive statistics and psychometric measurement validation – IS workers.

|                          | Mean<br>1-7 Scale | Standard<br>Deviation | AVE  | Composite<br>Reliability | Cronbachs Alpha |
|--------------------------|-------------------|-----------------------|------|--------------------------|-----------------|
| Absorptive Capacity      | 4.52              | 0.92                  | 0.64 | 0.95                     | 0.94            |
| Coordination Capability  | 5.02              | 0.62                  | 0.69 | 0.95                     | 0.94            |
| Manager Knowledge        | 5.17              | 0.92                  | 0.69 | 0.90                     | 0.85            |
| Socialization Capability | 4.46              | 1.10                  | 0.63 | 0.89                     | 0.85            |
| Systems Capability       | 4.52              | 0.99                  | 0.77 | 0.91                     | 0.86            |
| Worker Knowledge         | 4.85              | 1.11                  | 0.77 | 0.93                     | 0.90            |

Table 2b. Descriptive statistics and psychometric measurement validation – IS managers.



We assessed the extent of common methods variance (CMV) in the data with two tests - Harmon's one factor test (Podsakoff, MacKenzie, Lee, and Podsakoff, 2003), and the common method construct test. The results revealed no single factor accounting for a majority of variance and that the average variance explained by the substantive constructs was 0.74 for workers while the average variance explained by the common methods construct was 0.43 (0.65/0.39 for managers). Taken together, these analyses indicate that common methods bias did not significantly affect our results. The results of these tests demonstrate that our model meets or exceeds the rigorous standards expected in IS research (Straub, Boudreau, and Gefen, 2004). Overall, as the measurement model demonstrated adequate validity, the structural model was evaluated.

|                          | AC           | CC           | MK           | SC           | SyC          | WK           |
|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Absorptive Capacity      | <b>0.895</b> |              |              |              |              |              |
| Coordination Capability  | 0.583        | <b>0.913</b> |              |              |              |              |
| Manager Knowledge        | 0.638        | 0.473        | <b>0.920</b> |              |              |              |
| Socialization Capability | 0.727        | 0.460        | 0.678        | <b>0.877</b> |              |              |
| Systems Capability       | -0.223       | -0.155       | -0.242       | -0.261       | <b>0.769</b> |              |
| Worker Knowledge         | 0.521        | 0.370        | 0.582        | 0.542        | 0.037        | <b>0.918</b> |

Table 3a. Correlations among latent constructs – IS workers.

|                          | AC           | CC           | MK           | SC           | SyC          | WK           |
|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Absorptive Capacity      | <b>0.802</b> |              |              |              |              |              |
| Coordination Capability  | 0.468        | <b>0.832</b> |              |              |              |              |
| Manager Knowledge        | 0.422        | 0.429        | <b>0.833</b> |              |              |              |
| Socialization Capability | 0.615        | 0.340        | 0.549        | <b>0.793</b> |              |              |
| Systems Capability       | -0.148       | 0.109        | -0.112       | -0.276       | <b>0.879</b> |              |
| Worker Knowledge         | 0.332        | 0.440        | 0.444        | 0.314        | 0.181        | <b>0.880</b> |

Table 3b. Correlations among latent constructs – IS managers.

Note: The diagonals are the square roots of the average variance extracted (AVE) for each factor.

## 4 Results and Discussion

In order to test the structural model, the standard bootstrap resampling procedure (1,000 samples) in SmartPLS was used to determine the significant paths. Each of the constructs in the structural model was analyzed as a reflective construct. Table 4 shows the hypothesized relationships and the t-test statistic to indicate which paths are significant for both samples. For the IS workers, all of the paths from knowledge to the organizational capabilities are significant, and three paths are significant for the IS managers. In both models, perceived socialization and coordination capabilities positively influence absorptive capacity. In SmartPLS, the R-square value provides an indication of the percentage of explained variance of that latent construct and is a measure of the prediction quality of the structural model (Ringle, Wende, and Will, 2005). The R-square value for absorptive capacity is 0.625 for IS workers and 0.473 for IS managers (Figure 2).

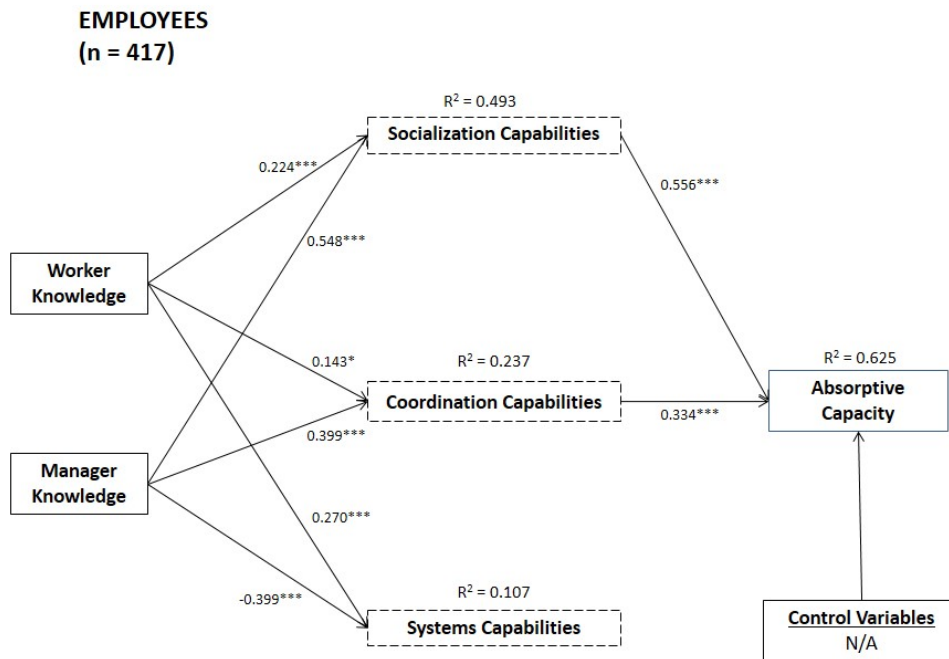


Figure 2a. Path model – IS workers.

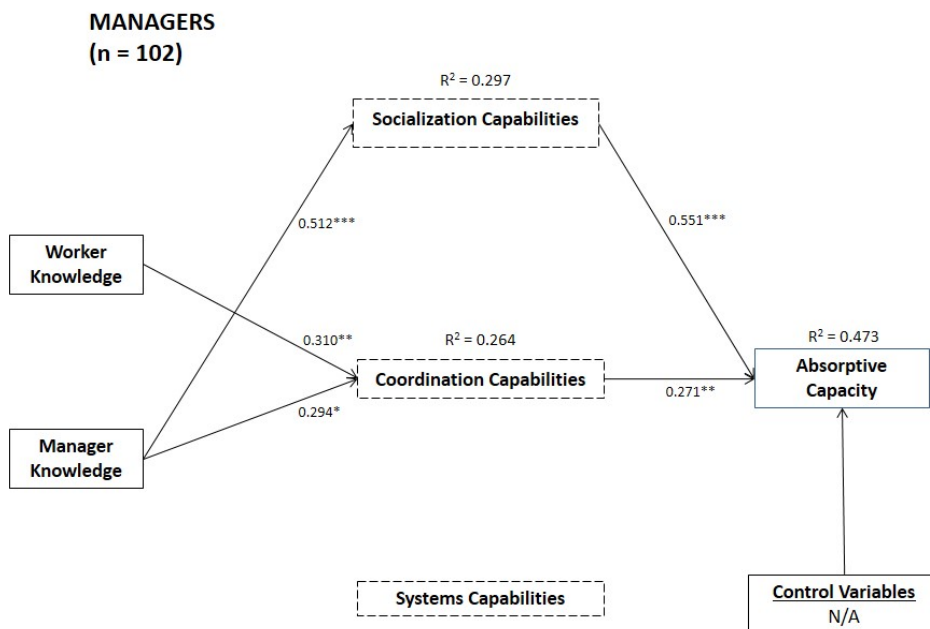


Figure 2b. Path model – IS managers.

| Path                           | Coefficient | T Statistic | Significance |
|--------------------------------|-------------|-------------|--------------|
| Coordination Capability -> AC  | 0.334       | 7.228       | 0.001        |
| Socialization Capability -> AC | 0.555       | 13.110      | 0.001        |
| Systems Capability -> AC       | -0.023      | 0.670       | ns           |
| Manager Knowledge -> CC        | 0.390       | 6.330       | 0.001        |
| Manager Knowledge -> SC        | 0.548       | 12.034      | 0.001        |
| Manager Knowledge -> SyC       | -0.399      | 7.758       | 0.001        |
| Worker Knowledge -> CC         | 0.143       | 2.260       | 0.05         |
| Worker Knowledge -> SC         | 0.224       | 4.671       | 0.001        |
| Worker Knowledge -> SyC        | 0.270       | 4.322       | 0.001        |

Table 4a. Path Significance – IS workers.

| Path                           | Coefficient | T Statistic | Significance |
|--------------------------------|-------------|-------------|--------------|
| Coordination Capability -> AC  | 0.271       | 2.952       | 0.01         |
| Socialization Capability -> AC | 0.551       | 6.131       | 0.001        |
| Systems Capability -> AC       | 0.066       | 0.685       | ns           |
| Manager Knowledge -> CC        | 0.294       | 2.535       | 0.05         |
| Manager Knowledge -> SC        | 0.512       | 5.772       | 0.001        |
| Manager Knowledge -> SyC       | 0.069       | 0.464       | ns           |
| Worker Knowledge -> CC         | 0.310       | 3.163       | 0.01         |
| Worker Knowledge -> SC         | 0.065       | 0.632       | ns           |
| Worker Knowledge -> SyC        | 0.232       | 1.794       | ns           |

Table 4b. Path Significance – IS managers.

Our first research question asked to what extent do perceptions of organizational and human capabilities influence the degree of absorptive capacity in state IS departments. Overall 62.5% (IS workers) and 47.3% (IS managers) of the variability in absorptive capacity was explained by two of the organizational capabilities, and two knowledge capabilities. We found full support for perceived socialization and coordination capabilities, and no support for perceived systems capabilities influencing absorptive capacity. The path coefficients of the proposed antecedents to absorptive capacity suggest that socialization capabilities have the strongest relationship with absorptive capacity for both samples. Organizations with disjointed cultures often face difficulties integrating change into their work practices (Kilmann, Saxton, and Serpa, 1985). Our finding indicates that strong, widely shared, and understood goals and values may be key to creating a culture which reinforces the need for IS personnel in U.S. state governments to seek useful knowledge to bring into the department and/or agency.

In this study the authors focused on the relationship between absorptive capacity and an IS department characterized by close supervision, and a plethora of rules, regulations, policies and procedures (systems capabilities mean = 4.67 for IS workers and 4.52 for IS managers on a 7-point scale). While the relationship was in the expected direction (negative), systems capabilities did not significantly influence absorptive capacity for either sample, suggesting further research regarding the nature of systems capabilities in this context is warranted.

Our second research question asked if the influence of perceived organizational and human capabili-

ties on the degree of absorptive capacity in state IS departments is consistent for IS managers and IS workers. In both models we see that perceived socialization and coordination capabilities strongly influence absorptive capacity. Given the difference in the R-square values for absorptive capacity (workers = 0.625 vs managers = 0.475) and the path coefficients from perceived coordination capabilities to absorptive capacity (workers = 0.334 vs managers = 0.271) one could speculate that workers may perceive that coordination capabilities play a stronger role in their absorptive capacity than do managers.

Looking at the antecedents of the three capabilities, from a worker view, worker knowledge influences all three capabilities, whereas from a managerial perspective worker knowledge only influences coordination capabilities (does not affect socialization or systems capabilities). As perceived socialization capabilities had the strongest influence on absorptive capacity in both models, perhaps managers within this context should consider further developing workers' socialization capabilities and related prior knowledge.

In addition, workers perceive that managerial knowledge negatively influences systems capabilities, whereas managers do not see any influence of prior knowledge on systems capabilities. We speculate that the relationship between perceived systems capabilities and absorptive capacity within a public sector environment may take on a different form than the other capabilities (e.g., mediate or moderate the other relationships). We suggest that future research should explore other forms of the model in a variety of contexts.

As with any study, limitations exist. One potential limitation is the selection bias from the CIO of each state distributing the e-mail to the IS personnel and requesting participation. The researchers do not know if each CIO included all potential participants of the agency or only selected some individuals to participate. Another limitation is that the sample did not include all 50 states. However, the response rate of 42% (workers) and 28% (managers) is good for public sector research (Riemenschneider, Allen, Armstrong, and Reid, 2010) and is encouraging. A final limitation is with regard to the items used in the study to assess the relationships between the constructs. Specifically, the items refer to the perceptions of the respondents, and not the actual occurrence of the characteristics described by the constructs. Thus future research should explore the extent that the perceived measures used in this study and objective measures of the constructs align so as to confirm or refute the findings of this study.

## **5 Implications and Conclusion**

Prior to this study, limited research had explored the relationship between organizational capabilities and absorptive capacity within the IS field, and almost none within the public sector. Findings from this study indicate that absorptive capacity is influenced by the focal unit's socialization and coordination capabilities. Regardless of whether they work in public or private organizations, IS personnel face the need to continually update technologies and processes in order to provide effective services to their constituents/clients in the most efficient, secure and economical manner possible. However, IS departments differ in the extent to which internal conditions exist which allow and/or encourage workers to identify and use external information and knowledge. For U.S. state government IS departments, this study lends insight into factors that influence absorptive capacity. Since socialization capabilities have the strongest influence on absorptive capacity, state CIOs and IS managers should ensure they share the department goals with workers which focus on continual learning, and identifying, acquiring, and using external information. In keeping with the trend in U.S. state government toward greater service consolidation, the service and performance goals of IS departments must become more clearly defined in the presence of continued budget shortfalls. Goals need to be established deliberately so that IS departments increasingly become more than information gatherers – that they become communicators, technology innovators and critical service units for their agencies and for the citizens of their states.

“The challenge for public sector organizations is to go beyond individual innovations to create a climate supportive of ongoing innovation on a large scale” (Borins, 2001, p. 318; Jun and Weare, 2011). State IS CIOs and managers should seek to develop a culture where the acquisition of new information and knowledge is encouraged and supported. A culture that encourages knowledge sharing and innovation via support to attend conferences and workshops or develop professional networks might potentially increase the IS department’s absorptive capacity and encourage innovation (Jun and Weare, 2011). It is also important that an organizational culture be created and maintained where workers recognize the importance of identifying and disseminating information to other units of state government. Future research could explore different departments/units (e.g., marketing) and different levels within the public sector environment (e.g., agency, state, country). This could allow comparisons within and across agencies and states so as to understand the interdependencies and potential synergies that could contribute to increased absorptive capacity in the public sector. Studies across U.S. state government agencies may even enhance cross-agency information sharing.

Future research is needed to identify the external conditions that might lead some states to develop coordination capabilities and to consider the broader institutional factors that Tolbert, Mossberger, and McNeal (2008) identified, such as ideological factors, or the state’s education levels. This poses a number of interesting questions for state IS departments: are states that have a strong strategic orientation more likely to acquire the information they need to innovate; are states in which IS departments are provided resources to collect information and assimilate it into suitable knowledge more likely to have professional legislatures who value of their work; and are states, in which CIOs are member of the governor’s cabinet, or where the IS department interacts closely with other units, more likely to anticipate, articulate, and plan for the future technology needs of state agencies. Anecdotal data from recent NASCIO surveys seem to support many of these contentions (NASCIO 2010; 2011).

Our results indicate that some states are building critical organizational capabilities. “The CIOs’ focus on transparency indicates that they recognize a key responsibility of all public servants is to be accountable for government spending, program performance and their actions. CIOs enable transparency with technology platforms, interfaces and tools that support this public policy agenda” (NASCIO 2011, p. 29). These tasks require organizational capabilities that support the employees’ ability to scan their environment for new information and knowledge, absorb it, and ultimately disseminate it throughout the agency.

| Construct                  | Sample Items   | Source  |
|----------------------------|--|---|
| Absorptive Capacity        | In the IT department, we are able to identify and acquire internal and external knowledge          | Pavlou and El Sawy, 2006                        |
| Coordination Capabilities  | We ensured that there was compatibility between project team members expertise and work processes. | Pavlou and El Sawy, 2006                        |
| Socialization Capabilities | IT employees have a clear understanding of what the department’s values and philosophies are.      | Van der Post, de Coning, and Smit, 1997         |
| Socialization Capabilities | The IT department’s mission is clear to almost everyone who works here.                            | Pandey and Rainey, 2006                         |
| Manager Knowledge          | The knowledge of our managers is adequate when dealing with new technologies.                      | Tu, Vonderembse, Ragu-Nathan, and Sharkey, 2006 |
| Systems Capabilities       | IT employees have to observe many rules and regulations in doing their work.                       | Van der Post, de Coning, and Smit, 1997         |
| Worker Knowledge           | The overall technical knowledge of our first-line IT employees is high.                            | Tu, Vonderembse, Ragu-Nathan, and Sharkey, 2006 |

Appendix. Sample Construct Items and Source

## References

- Barrett, K., and R. Greene (2008). "Grading the states: The mandate to measure." *Governing* 21 (6), 24-95.
- Bekkers, V., and V. Homburg (2005). *Information Ecology of E-Government: E-Government as Institutional and Technological Innovation in Public Administration*. IOS Press Inc. Amsterdam, The Netherlands.
- Berman, E. M., and J. P. West (1998). "Productivity enhancement efforts in public and nonprofit organizations." *Public Productivity and Management Review* 22(2), 207-219.
- Berry, C., G. Krutz, B. Langner, and P. Budetti (2008). "Jump-starting collaboration: The ABCD initiative and the provision of child development services through Medicaid and collaborators." *Public Administration Review* 68(3), 480-490.
- Borins, S. (2001). "Encouraging innovation in the public sector." *Journal of Intellectual Capital* 2(3), 310-319.
- Chin, W. (1998). "The partial least squares approach for structural equation modelling." *Modern Methods for Business Research* 295 (2), 295-336.
- Cohen, W. M. and D. A. Levinthal (1989). "Innovation and learning: The two faces of R&D." *The Economic Journal* 99 (397), 569-596.
- Cohen, W. M. and D. A. Levinthal (1990). "Absorptive capacity: A new perspective on learning and innovation." *Administrative Science Quarterly* 35 (1), 128-152.
- Deshpande, R. and G. Zaltman (1982). "Factors affecting the use of market research information: A path analysis." *Journal of Marketing Research* 19 (1), 14-31.
- Eisenhardt, K., and J. Martin (2000). "Dynamic capabilities: What are they?" *Strategic Management Journal* 21 (10-11), 1105-1121.
- Fornell, C. and D. Larcker (1981). "Evaluating structural equation models with unobservable variables and measurement error." *Journal of Marketing Research* 18 (1), 39-50.
- Gefen, D., E. E. Rigdon, and D. Straub (2011). "Editor's comments: An update and extension to SEM Guidelines for Administrative and Social Science Research." *MIS Quarterly* 35(2), iii-xiv.
- Gil-Garcia, J. R., Chengalur-Smith, I., and Duchessi, P. (2007). "Collaborative e-Government: impediments and benefits of information-sharing projects in the public sector." *European Journal of Information Systems* 16 (2), 121-133.
- Hair, J., W. Black, B. Babin, R. Anderson, and R. Tatham (2006). *Multivariate Data Analysis*. Pearson-Prentice Hall, Upper Saddle River, NJ.
- Harvey, G., C. Skelcher, E. Spencer, P. Jas, and K. Walshe (2010). "Absorptive capacity in a non-market environment: A knowledge-based approach to analysing the performance of sector organizations." *Public Management Review* 12 (1), 77-97.
- Janairo, E. (2000). "Technical difficulties: hiring and keeping IT employees in state government." *Council of State Governments*, Lexington, KY.
- Jansen, J., F. Van den Bosch, and H. Volberda (2005). "Managing potential and realized absorptive capacity: How do organizational antecedents matter?" *Academy of Management Journal* 48 (6), 999-1015.
- Jun, K.-N., and C. Weare (2011). "Institutional motivations in the adoption of innovations: The case of e-government." *Journal of Public Administration Research and Theory* 21 (3), 495-519.
- Kane, G. C., and M. Alavi (2007). "Information technology and organizational learning: An investigation of exploration and exploitation processes." *Organization Science* 18 (5), 796-812.
- Kilmann, R., M. Saxton, and R. Serpa (1985). *Gaining Control of the Corporate Culture*. Jossey Bass, San Francisco, CA.
- Kogut, B., and U. Zander (1992). "Knowledge of the firm, integration capabilities, and the replication of technology." *Organization Science* 3 (3), 383-397.

- Kor, Y. Y. and A. Mesko (2013). "Dynamic managerial capabilities: Configuration and orchestration of top executives' capabilities and the firm's dominant logic." *Strategic Management Journal* 34 (2), 233-244.
- Leal-Rodríguez, A. L., J. L. Roldán, J. A. Ariza-Montes, and A. Leal-Millán (2014). "From potential absorptive capacity to innovation outcomes in project teams: The conditional mediating role of the realized absorptive capacity in a relational learning context." *International Journal of Project Management* 32 (6), 894-907.
- Moore, M. H. (2005). "Break-through innovations and continuous improvement: Two different models of innovative processes in the public sector." *Public Money and Management* 25 (1), 43-50.
- National Academy of Public Administration. (2001). "The transforming power of information technology: Making the federal government an employer of choice for IT employees." NAPA, Washington, DC.
- National Association of State Chief Information Officers (NASCIO). 2010. "The 2010 state CIO survey." NASCIO, Lexington, KY.
- National Association of State Chief Information Officers (NASCIO). 2011. "A new C4 agenda." NASCIO, Lexington, KY.
- Neter, J., W. Wasserman, and M. H. Kutner (1990). *Applied Linear Statistical Models*. Richard D. Irwin, Inc, Burr Ridge, IL.
- Ojo, A. O., M. Raman, S. Chong, and C. W. Chong (2014). "Individual antecedents of ACAP and implications of social context in joint engineering project teams: A conceptual model." *Journal of Knowledge Management* 18 (1), 177-193.
- Pandey, S. K., and H. G. Rainey (2006). "Public managers' perceptions of organizational goal ambiguity: Analyzing alternative models." *International Public Management Journal* 9 (2), 85-112.
- Pang, M.-S., A. Tafti, and M. S. Krishnan (2014). "Information technology and administrative efficiency in U.S. state governments: A stochastic frontier approach." *MIS Quarterly* 38 (4), 1079-1101.
- Pavlou, P. and O. El Sawy (2006). "From IT leveraging competence to competitive advantage in turbulent environments: The case of new product development." *Information Systems Research* 17 (3), 198-227.
- Podsakoff, P. M., S. B. MacKenzie, J.-Y. Lee, and N. P. Podsakoff (2003). "Common method biases in behavioral research: A critical review of the literature and recommended remedies." *Journal of Applied Psychology* 88 (5), 879-903.
- Rainey, H. (2003). *Understanding and Managing Public Organizations*. Jossey-Bass, San Francisco, CA.
- Riemenschneider, C. K., M. W. Allen, D. J. Armstrong, and M. F. Reid (2010). "Potential absorptive capacity of state IT departments: A comparison of perceptions of CIOs and IT managers." *Journal of Organizational Computing and Electronic Commerce* 20 (1), 68-90.
- Rich, S. (2011). *Transparency Demands Cost Government's Money*. URL: <http://www.govtech.com/e-government/Transparency-Demands-Cost-Governments-Money.html/> (visited on 11/20/2011).
- Ringle, C. M., S. Wende, and A. Will (2005). *SmartPLS 2.0*. <http://www.smartpls.de>.
- Scherlis, W. L., and J. Eisenberg (2003). "IT research, innovation, and e-government." *Communications of the ACM* 46 (1), 67-68.
- Singer, L. (1995). *Public vs. Private Sector IT Strategies*. URL: <http://www.govtech.com/magazines/gt/Public-vs-Private-Sector-IT-Strategies.html?page=2/> (visited on 03/12/2015).
- Stazyk, E. and H. Goerdel (2011). "The benefits of bureaucracy: Public managers' perceptions of political support, goal ambiguity, and organizational effectiveness." *Journal of Public Administration Research and Theory* 21 (4), 645-672.
- Straub, D., M. C. Boudreau, and D. Gefen (2004). "Validation guidelines for IS positivist research." *Communications of the Association for Information Systems* 13 (1), 380-427.

- Tolbert, C., K. Mossberger, and R. McNeal (2008). "Institutions, policy innovation and e-government in the American states." *Public Administration Review* 68 (3), 549-563.
- Todorova, G., and B. Durisin (2007). "Absorptive capacity: Valuing a reconceptualization." *Academy of Management Review* 32 (3), 774-786.
- Tu, Q., M. Vonderembse, T. Ragu-Nathan, and T. Sharkey (2006). "Absorptive capacity: Enhancing the assimilation of time-based manufacturing practices." *Journal of Operations Management* 24 (5), 692-710.
- Van den Bosch, F., H. Volberda, and M. de Boer (1999). "Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities." *Organization Science* 10 (5), 551-568.
- Van der Post, W., T. De Coning, and E. Smit (1997). "An instrument to measure organizational culture." *South African Journal of Business Management* 28 (4), 147-169.
- Willem, A. and M. Buelens (2007). "Knowledge sharing in public sector organizations: The effect of organizational characteristics on interdepartmental knowledge sharing." *Journal of Public Administration Research and Theory* 17 (4), 581-606.
- Yang, K., and J. Melitski (2007). "Competing and complementary values in information technology strategic planning: Observations from ten states." *Public Performance and Management Review* 30 (3), 426-452.
- Zahra, S. and G. George (2002). "Absorptive capacity: A review, reconceptualization, and extension." *Academy of Management Review* 27 (2), 185-203.