

Predictive modeling of organizational resilience utilizing leadership frame orientation

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ABSTRACT

This research study describes the correlations between leadership frames and resiliency planning within two higher education teaching and research institutions. The researchers employed a quantitative methodology utilizing logistic regression. The data was obtained from a web-based instrument. Four leadership frames along with two covariates were analyzed for their correlation with resiliency planning. The analysis discloses one leadership frame as a predictor of disaster recovery planning. Furthermore, one leadership frame appears to be the preferred frame for leaders of academic resiliency planning. Additionally, gender differences in framing adoption were analyzed in this study. This research is exploratory in nature and was specifically limited to the individual academic departments within two universities in order to provide a deeper insight into resiliency planning with these and similar institutions. The results are significant in that the leaders of similar intuitions can gage their resiliency and recovery capabilities as well provide guidance for recruitment efforts in resiliency efforts.

Keywords: Contingency planning, disaster recovery, business continuity, leadership, leadership frames

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INTRODUCTION

Organizational resiliency components include both business continuity (BC) efforts as well as disaster recovery (DR) efforts. BC planning tends to be more holistic and cover all of the organization's business processes and operational functionality. DR planning is more unit specific (generally the Information Technology (IT) department is the most well-known) and technical. In BC/DR, the organization is in recovery mode and as such, operations have ceased. In this research study, the leadership frame orientation of BC/DR planners was assessed and any correlations with resiliency planning (BC plan or DR plan) were analyzed.

BC/DR planning is an essential portion of any organization's strategic planning (Adams, 2004). Incidents such as the Y2K scare, computer systems intrusions, natural hazards, and terrorist attacks continually reinforce the necessity of continuity planning (Dalmadge, 2001).

The separate topics of leadership frame orientations and resiliency planning efforts are well-discussed within the research literature. However, the linkage between the two ideas has not been examined. In an effort to address this gap in the research literature, the BC and DR efforts within the academic departments of two geographically similar (southern California) public research and teaching universities were studied. The following hypotheses are proposed:

Null Hypothesis (H_{10}): There is no correlation between the leadership frame orientations of resiliency leaders and the BC planning efforts within two geographically similar (southern California) public research and teaching universities.

Alternative Hypothesis (H_{1A}): There is a correlation between the leadership frame orientations of resiliency leaders and the BC planning efforts within two geographically similar (southern California) public research and teaching universities.

Null Hypothesis (H_{20}): There is no correlation between the leadership frame orientations of resiliency leaders and the DR planning efforts within two geographically similar (southern California) public research and teaching universities.

Alternative Hypothesis (H_{2A}): There is a correlation between the leadership frame orientations of resiliency leaders and the DR planning efforts within two geographically similar (southern California) public research and teaching universities.

This research study determined if any correlations exist between leadership frame orientations and the extent of BC/DR planning in two research/teaching institutions utilizing these two hypotheses. Furthermore, gender preferences within leadership frame orientations were examined.

A web-based survey instrument was designed (see the section on Instrument Construction Methodology below). The academic department leaders tasked with resiliency efforts were then invited to respond. Following the data collection period, the data was analyzed for correlations using SPSS software package. The results could be utilized by leaders of similar research and teaching universities in order to gage their resiliency and recovery capabilities as well provide guidance for recruitment efforts in resiliency efforts.

BACKGROUND LITERATURE

There are two concepts that define the scope of this study: Organizational Resiliency (i.e., Business Continuity and Disaster Recovery) and Leadership Frame Orientation. In this section, the two concepts are explained within the context of the existing body of scientific knowledge on the subjects.

Organizational Resiliency (Business Continuity and Disaster Recovery Planning)

Resiliency, in perhaps its broadest sense refers to the ability to bounce back from a disruption (Coaffee, 2008). The term is used in a variety of contexts and disciplines such as psychology, geography, and economy (Coaffee, 2013). As it pertains to the organizational sense, “resilience” is used in context of crises and is understood as the organizations capacity to maintain ‘positive adjustment under challenging conditions such that the organization emerges from those conditions strengthened and more resourceful’ (Vogus & Sutcliffe, 2007, p. 3476).

As it pertains to disasters, resiliency is a concept that continues to evolve. While disaster resistance has been identified as relating more to its focus on resisting disastrous effects, disaster resilience extends into a focus on the effective response and recovery in the wake of a disaster. In essence, a resilient system is one that might bend from whatever force is acting on it but will not break (Godschalk, 2003). In the area of higher education, the necessity of having plans that encourage proactivity, particularly with the emergence of various on-campus tragedies and surrounding environmental catastrophes, have become a focal point (Kapucu & Khosa, 2012). On-campus tragedies include the Virginia Tech massacre in which 32 people were killed. An example of an off-campus event that significantly impacted surrounding college campus was Hurricane Katrina in 2005, in which the universities were an integral resource in providing resources to disaster victims. Identified as an element of a disaster-resilient university (DRU), institutions of higher education, are formulating resiliency models that facilitate a culture of readiness that is better equipped for the many dangers that may transpire. In creating a DRU, developing an all-hazards comprehensive emergency management plan (CEMP), building strong community partnerships, and developing methods for training and exercises in campuses have been the most important components to its development (Kapucu & Khosa, 2012). While not shown to be a significant factor in DRU formation, leadership was still regarded as important. A majority (87.1% of respondents) indicated that university leadership actively supports emergency management efforts on campus. This support includes garnering buy-in and participation from both internal and external stakeholders (Kapucu & Khosa, 2012).

The Disaster Recovery Institute (2012) provides training, certification, and a set of standards for professional practices for business continuity planners. The Institute’s standards are accepted by the European-based Business Continuity Institute as well. These standards were adopted in this research study as they relate to BC/DR efforts. Prior versions of the Disaster Recovery Institute’s standards were utilized in the work of Greer (2003), Hartshorne (2007) and adopted by industry as well.

Leadership Frame Orientation

According to Bolman and Deal (1991), there are four leadership frame orientations: structural, human resources, political, and symbolic. Frames are the lens through which organizational leaders view the environment. The frame provides context for the leader and assists in the decision making process (Shirbagi, 2007). In social science literature, the concept of leadership frames has been described by several terms including leadership paradigms, schema, and representations. Whatever the terminology, the frame is how leaders experience a situation and formulate solutions and actions.

Leaders adopting the structural frame put their emphasis on the design and architecture of the organization (Bolman & Deal, 2003). Policies, procedures, chain of command,

responsibilities and task alignment to organizational structure are the concepts of focus. Leaders tend to focus on organizational hierarchy and alignment of effort.

The human resource frame emphasizes the personnel within the organization (Bolman & Deal, 2003). Alignment of people to the organization and an understanding of people are the focus. Leaders adopting this frame see people as the primary asset to any organization.

The political frame concentrates on resource acquisition (Bolman & Deal, 2003). Leaders adopting this frame view organizations as a political jungle where competition for scarce resources is a primary activity. Power, politics and the pursuit of power are the focus. The building of coalitions, negotiating, and compromising are the skills utilized by these leaders.

The symbolic frame centers on the vision of the organization (Bolman & Deal, 2003). The organization is viewed as the theater where the drama unfolds. Leaders adopting this framework focus on the culture, spirit and the vision of the organization. Rituals and symbols of the organization provide the meaning for its members.

The use of leadership frame orientation has been integrated into the educational domain for a variety of purposes. For example, school principals integrate their leadership frame to utilize student assessment data in the way they feel will translate into the accomplishment of school goals, and identify strengths and weaknesses of its students (Hellsten, Noonan, Preston, & Prytula, 2013). A mixed-frame approach to assessment, that is no significant differences in preference for structural, human resource, political, or symbolic frame, was observed in this particular study. Taken another way, principals used all of these approaches with regard to their use of data from student assessments (i.e. standardized testing). In another study, school counselors were assessed by teachers and principals as to the degree in which they believed them to embody certain leadership behaviors related to leadership frame orientation (Alsmadi & Mahasneh, 2011). All counselors were perceived to perform these leadership behaviors, at least occasionally. Alsmadi and Mahasneh (2011) were surprised by these findings as school counselors are not typically offered leadership training. Although significance was not reached, political leadership was viewed as the characteristic most performed by school counselors, while symbolic leadership was performed the least. Taken together, counselors were seen as being able to negotiate and communicate with school personnel and community while not as proficient in their involvement in motivating others toward the vision of the school (Alsmadi & Mahasneh, 2011).

Several health science education programs (i.e., nursing, occupational therapy, medicine residency directors, radiation therapy, interdisciplinary, and health information management) have been evaluated in terms of the leadership orientation framework approach (Sasnett & Clay, 2008). In all six disciplines, the human resource frame is observed as the most frequent frame of leadership. Sasnett and Clay (2008) defended the findings by explaining the importance of communication, interpersonal interactions, establishing empathy and rapport, as well as relationship building that is consistent with the human resource style of leadership.

Research is scant with regard to institutions of higher education using the leadership framing approach toward disaster resiliency. A recent article by Berstene (2014) commented on the importance of open communication within the change management process. This involves being accustomed to listening and placing considerable value in the ideas of those 'in the trenches' (Berstene, 2014, p. 39). Communicating the rationale for how the organization will look to adapt to change, as well as the willingness to integrate input among its members would seem to demonstrate the predisposition toward a human resource style of leadership.

Bolman and Deal (1991) researched leadership frame orientation in education. Their research covered world-wide institutions ranging from K-12 through higher education. In their work, they found that the structural frame was the most widely adopted leadership frame. Relatedly, the symbolic frame orientation was the least utilized in the sample sets.

Leaders of resiliency efforts are often viewed in the framework of their “adaptive capacity” (Zhang & Liu, 2012, p.57). Being able to adapt to environmental jolts is a necessary prerequisite for resiliency. The research question for this study is: Which leadership frame is a predictor for depth and breadth of BC/DR planning?

For purposes of this study, department size and budget demographics were utilized as covariates. These variables could significantly impact resiliency planning. It would be logical to assume that a large budget and large number of personnel could result in an increase in BC/DR planning.

The research literature is rich with studies on organizational continuity planning. Additionally, there exists a great deal of research literature on leadership and leadership frame orientation in academic institutions. However, no study exists that addresses correlations between the two concepts. In this paper, that gap within the research literature is addressed.

METHODOLOGY

The methodology employed for this study was a quantitative methodology utilizing logistic regression. The degree of association between leadership frame orientation scores and disaster recovery planning as well as business continuity planning was identified utilizing logistic regression. Creswell (2005) states that this is a suitable methodology for identifying direction and association between sets of variables. Furthermore, correlational research is “useful for identifying the type of association, explaining complex relationships of multiple factors that explain outcome and predicting an outcome from one or more predictors” (Creswell, 2005, p. 338). Robson (2002) further discusses correlational research as useful in identifying associations between multiple variables by suggesting stepwise regression to build a model beginning with the simplest model (equation) and injecting more independent variables. Binary logistic regression was utilized in this modeling as the predicted outcomes of having a BC or DR plan were binary (yes or no).

According to Sarkar and Midi (2010), “the binary logistic regression procedure empowers one to select a predictive model for dichotomous dependent variables (p. 479). As the dependent variables in this study were both binary (yes or no), this methodology is appropriate for the study.

Independent Variables

The independent variables selected for this study were the four leadership frames described by Bolman and Deal (1991): structural leadership frame orientation, human resources leadership frame orientation, political leadership frame orientation, and the symbolic leadership frame orientation.

Covariate Variables

The focus of this research was to isolate any correlations between leadership frame orientations and the existence of a BC or DR plan. According to Creswell (2005) personal factors (demographic characteristics) or environmental factors may influence (co-vary) the dependent variables but are unrelated to the independent variables. The size of the academic department (i.e., number of personnel) or the dollar amount of the budget could be significant covariates with regard to BC or DR planning. As such, those two variables were isolated and analyzed for covariance.

Dependent Variables

In this study, two dependent variables were isolated for this research study: existence of a DR plan and existence of a BC plan. Logistic regression was utilized to create a model demonstrating the degree of correlation between leadership frame orientation and plan existence. Logistic regression is appropriate as both dependent variables and nominal and have binary outcomes (i.e., they are dichotomous) (Sarkar and Midi, 2010).

An academic unit that performs some degree of resiliency planning would have a DR plan. As such, correlation with leadership frame and the existence of a DR plan was modeled.

An academic unit having a more holistic BC plan indicates a larger degree of resiliency and preparedness planning. Any association between leadership frame orientation and the existence of a BC plan was analyzed for correlation in this study.

Instrument Construction Methodology

This research project utilized an existing instrument that was part of the Davison (2014) work on organizational resilience and leadership demographics. The genesis of the instrument is with Greer's (2003) Contingency Planning Survey and the Bolman and Deal (2008) Leadership Orientations survey.

The survey instrument was coded and put on the Web. While this instrument is the combination of two instruments accepted as valid and reliable, further steps were taking to ensure validity and reliability.

A group of sociologists agreed to assess the web-based instrument. Their suggestions on wording and phrasing were incorporated in a second version of the instrument. This version were further refined by a panel of university personnel that are organizational resiliency practitioners. Their suggestions were then incorporated into the final version of the instrument.

Data Collection

After the instrument was made available on the Internet via a password protected web site, emails (and some follow-up phone calls to encourage participation) were sent to the BC/DR coordinators of each academic unit. Usually the facilities managers of each unit are charged with the organizational resiliency efforts for that unit. The two universities studied follow a decentralized model of resiliency planning in which the academic units take responsibility for the efforts. The resiliency planning personnel were identified by searching the academic department's directory.

The entire sample space for both universities was 40 personnel. In this study, an exploratory study, a sample space of 40 will provide solid insight into the two geographically similar research and teaching institutions. Of the 40 personnel invited to participate, 35 error-free and usable responses were obtained. With an N of 35, suitable for an exploratory study, a suggested future research direction would be to expand this study to more universities and more geographic regions.

The software package utilized to collect the data and host the instrument was Qualtrics. After the data was obtained, the results were analyzed utilizing both the SPSS and the Microsoft Excel software packages.

RESULTS

The results indicate that there is no correlation between leadership frame orientation and business continuity planning. However, there was a correlation between the structural frame orientation and disaster recovery planning. Additionally, the results indicate an interesting phenomena with regard to leadership orientation: the majority of leaders within the domain demonstrated a tendency to adopt the human resource leadership orientation frame. That phenomena was particularly pronounced among females. The human resource frame was followed by the structural leadership orientation frame, which was adopted by approximately 1/3 of the survey population. The other frames (symbolic and political) were represented only one time each, with three ties.

Overall Leadership Frame Orientation

The results of this study indicates that the human resources leadership frame orientation tends to be the favored leadership frame among the surveyed population, as indicated in Table 1 (Appendix). As the human resources frame is an orientation that focuses on people and their fit within the organization and task, it is logical to conclude that BC/DR leaders are concerned with organizational resiliency as a function of personnel.

As indicated in Table 1 (Appendix), the preference for the human resource frame (51%) was followed by the structural frame (34%) preference. Those two types of leadership orientation were by far the most preferred. One interesting finding is the lack of representation by both the symbolic frame and the political frame. Both of those leadership frame orientations were represented by only one data point per orientation.

Leadership Frame Orientations as Predictors of Business Continuity Planning

The results of this study indicate that there is no correlation between leadership frame orientation and having a contingency plan. Human resources and structural framing were selected as predictors of contingency planning as indicated in Table 2 and Table 3 (Appendix). As a result of this lack of correlation, no predictive model of BC planning could be generated from the data.

Leadership Frame Orientations as Predictors of Disaster Recovery Planning

The human resources and the structural leadership frames were then analyzed for correlations (predictors) with having a disaster recovery plan in place. The results, as indicated in Table 4 and 5 (Appendix) show a correlation between the structural frame and the existence of a disaster recovery plan. A correlation does not exist for human resources framing.

As a result of this correlation, a predictive model of disaster recovery planning could be generated from the data. For a contingency planner adopting a structural frame orientation, the odds are significantly more likely they will have a disaster recovery plan than planners adopting one of the other leadership frames.

Gender Distribution of Leadership Frame Orientations

Table 6 and Table 7 (Appendix) provide insight to the distribution of male and female participants according to their leadership frame orientation. Females tended to adopt the Human Resource leadership frame (11 out of 19), followed by the Structural orientation (5 of 19). None identified themselves by the symbolic leadership frame, and only one chose the political leadership frame.

Males adopt either the Human Resource (7 out of 16) or Structural leadership (7 out of 16) frame. Only one identified with the Symbolic frame and none appeared to adopt the political leadership frame as their primary leadership frame orientation.

Each of the four framing scores were then analyzed by gender group. When analyzing each of the four leadership frame orientations, ANOVA analysis indicated that there is no statistically significant difference between male and female group frame scores. This indicates that within the frame there were no significantly impactful high or low scores that were produced by either gender group.

Multicollinearity analysis / Covariates.

Creswell (2005) states that certain demographics of environmental factors can influence the dependent variables. These variables may be unrelated to the independent variables of leadership frame orientations. Covariates such as budget amounts (US dollars) and department size (in number of personnel) were isolated and analyzed. It is reasonable to suspect that larger departments or larger budgets could impact BC and DR planning. These variables were isolated and excluded from the regression model and in the resulting regressions the variance inflation factor values for the remaining variables were < 2.00 .

Impact of Results on Hypotheses

There were two hypotheses in this study. The first centered on the frame orientation and its correlation to BC planning (a more holistic depth of contingency planning). The second centered on frame orientation and its correlation to DR planning. In the case of BC planning the Null Hypothesis (H_10) was stated as: There is no correlation between the leadership frame orientations of resiliency leaders and the BC planning efforts within two geographically similar (southern California) public research and teaching universities. The results did not allow the Null (H_10) to be rejected.

In the case of DR planning the Null Hypothesis (H_2O) was stated as: There is no correlation between the leadership frame orientations of resiliency leaders and the DR planning efforts within two geographically similar (southern California) public research and teaching universities. The results did allow for rejection of the Null (H_2O) hypothesis and acceptance of the Alternative Hypothesis (H_2A): There is a correlation between the leadership frame orientations of resiliency leaders and the DR planning efforts within two geographically similar (southern California) public research and teaching universities.

DISCUSSION AND IMPLICATIONS OF THE STUDY

The results from this study indicate that two leadership frames (human resources frame and the Structural frame) tend to dominate the BC/DR planning leadership orientation. While there was no correlation between framing and BC planning, the results of this study indicate that there is a correlation between the structural frame and DR planning. Furthermore, there were variations in leadership frame orientation among males and females, with females demonstrating a preference for the human resources frame.

The implications for this study have an applied interpretation. An organization can utilize the frame orientation to select resiliency consultants or intra-organizational resiliency team leaders. This study was exploratory in nature and limited to academic institutions. However, it can provide senior managers a basis for leadership selection.

Suggestions for Future Research

There are two possibilities for future research within this area. As an exploratory study, the scope was limited to business continuity and disaster recovery planning in two geographically similar (southern California) public research and teaching universities. Expanding this study to more universities and increasing the data set would be an appropriate extension of this work. Incorporating larger geographic regions would provide better insight into academic resiliency planning and perhaps a more generalizable model.

Additionally, this study could be expanded to include other organizations outside of academia. The survey could be given to BC/DR leaders in private firms and the results compared to academic institutions. This could possibly reveal some interesting differences between various types of organizations.

CONCLUSION

This research study explored the relationships of leadership frame orientation to business continuity and disaster recovery planning in two geographically similar (southern California) public research and teaching universities. The methodology employed was a quantitative, correlational approach. The results indicate there is a correlation between the structural leadership frame orientation and performing disaster recovery planning.

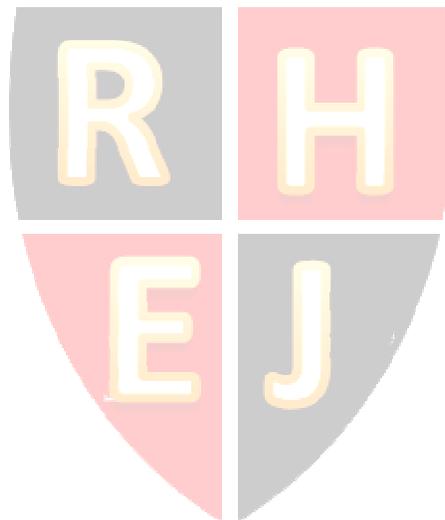
Furthermore, the results indicate that leadership frame orientation remained consistent between males and females. Both groups tended to adopt either a human resource or structural leadership frame, with the former being the frame most adopted by female participants. Structural orientation was also adopted among both males and females. Male emergency response coordinators' preference for this frame tied with the human resources frame.

This research is exploratory in nature and was specifically limited to the individual academic departments within two geographically similar research and teaching universities. The results provided a deeper insight into resiliency planning with these and similar institutions. The results are significant in that the leaders of similar intuitions can gage their resiliency and recovery capabilities as well provide guidance for recruitment efforts in resiliency efforts.

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APPENDIX

Table 1.

Overall Leadership Frame Orientation among BC/DR *Planners*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Tie	3	8.6	8.6	8.6
Structural	12	34.3	34.3	42.9
HR	18	51.4	51.4	94.3
Political	1	2.9	2.9	97.1
Symbolic	1	2.9	2.9	100.0
Total	35	100.0	100.0	



Table 2.

Human resources Leadership Frame as a Predictor of Contingency Planning

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 Constant	-.693	.500	1.922	1	.166	.500

Table 3.

Structural Leadership Frame as a Predictor of Contingency Planning

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 Constant	.000	.577	.000	1	1.000	1.000

Table 4.

Human Resources Leadership Frame as a Predictor of Disaster Recovery Planning

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 Constant	.956	.526	3.297	1	.069	2.600

Table 5.

Structural Leadership Frame as a Predictor of Contingency Planning

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 Constant	1.609	.775	4.317	1	.038	5.000

Table 6.

Leadership Frame Orientation by Gender (Male)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Tie	1	6.3	6.3	6.3
Structural	7	43.8	43.8	50.0
HR	7	43.8	43.8	93.8
Symbolic	1	6.3	6.3	100.0
Total	16	100.0	100.0	

Table 7.

Leadership Frame Orientation by Gender (Female)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Tie	2	10.5	10.5	10.5
Structural	5	26.3	26.3	36.8
HR	11	57.9	57.9	94.7
Political	1	5.3	5.3	100.0
Total	19	100.0	100.0	

