Implementation of Electronic Health Records and Entrepreneurial Strategic Orientation in Substance Use Disorder Treatment Organizations

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ABSTRACT. Objective: This research studied the relationships of the components of entrepreneurial strategic orientation (ESO) with implementation of electronic health records (EHRs) within organizations that treat patients with substance use disorders (SUDs). **Method:** A national sample of 317 SUD treatment providers were studied in a period after the Health Information Technology for Economic and Clinical Health (HITECH) Act was enacted (2009) and meaningful use EHR requirements were established (2010), but before implementation of the Affordable Care Act. The study sample was selected using stratified random sampling and was part of a longitudinal study of treatment providers across the United States. **Results:** After we controlled for potentially confounding variables, four components of ESO had a significant re-

lationship with EHR implementation. Levels of slack resources in an organization moderated the relationship of ESO with meaningful use of EHRs, increasing the strength of the relationship for some components but reducing the strength of others. **Conclusions:** From a policy and practice perspective, the results suggest that training and education to develop higher levels of ESO within SUD treatment organizations are likely to increase their level of meaningful use of EHRs, which in turn may enhance the integration of SUD treatment with primary medical providers, better preparing SUD treatment providers for the environmental changes of the Affordable Care Act. (*J. Stud. Alcohol Drugs*, 76, 942–951, 2015)

SUBSTANCE USE DISORDER (SUD) treatment organizations have been challenged by the National Institutes of Health to implement electronic health records (EHRs). This encouragement is based on assumptions that EHRs will increase integration of SUD treatment with primary care and also will help serve increased patient enrollments stimulated by expanded coverage available under the Affordable Care Act (Ghitza et al., 2011; Molfenter et al., 2012; Tai & McLellan, 2012). Some studies suggest that, under the Affordable Care Act, SUD providers will encounter patients with more diverse needs requiring more coordinated care (Croft & Parish, 2013). In addition, more patients with SUD treatment coverage will require that services be tracked and billed for reimbursement. Both of these requirements may be facilitated by EHR systems (Buck, 2011; Tai et al., 2012).

Other benefits of implementation of EHRs may include linkages for coordinated care and wraparound services, monitoring of patient progress to support clinical decisions, and standardization of patient health indicators (Tai et al., 2012).

The evidence base for these assumptions is equivocal. Some studies have found that EHRs may not improve treatment efficiencies or quality of care for patients with multiple disorders (Harman et al., 2012; McCormick et al., 2012). In addition, development and implementation of EHRs may involve substantial commitment of organizational resources that may affect other aspects of system functioning (Chaudhry et al., 2006; DesRoches et al., 2012; Vest, 2010). Nonetheless, field leadership is nearly unanimous in pressing EHR implementation as a critical strategic organizational decision for SUD treatment providers (Lewis et al., 2013; Molfenter et al., 2012).

This study examined the relationship between an organization's entrepreneurial strategic orientation (ESO) and the implementation of EHRs, using data collected from a national sample of 317 SUD treatment organizations in 2009–2011, a time when the requirements for use of EHRs had been articulated but before any penalties for noncompliance were imposed. Because relative availability of staff and other resources may affect the extent to which components of ESO may influence implementation, the study also examined the extent to which the relationships of ESO differed across levels of organizational resources.

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Electronic health records

A stated EHR goal of nationwide EHR adoption is improvement of quality and safety of patient care by creating a single cumulative record of patient health information accessible to multiple health care providers. To improve health care delivery and cost-effectiveness, EHRs should enhance coordination of care, provide up-to-date and accurate data on the patient, and include at least one clinical decision support tool (Gilmer et al., 2012). To function as the primary tool for integration of services and assessment of quality, EHR implementation must meet a standard of "meaningful use" (Blumenthal & Tavenner, 2010; Tai et al., 2012). Meaningful use of EHR systems must include capabilities for health information exchange between different treatment types and organizations, collection and maintenance of patient records, tools that support clinical decisions, and production of summary documents helpful in judging quality of care provided by an organization (Jha, 2010).

Some studies have found that meaningful use of EHRs has improved quality processes and clinical outcomes in some hospitals, in part by providing tools that improve organizational management (Appari et al., 2013). Besides improving the quality of patient care, meaningful use of EHRs may lead to financial gains for treatment providers through more efficient use of staff, and more efficient management of information for third-party reimbursement (Peterson et al., 2011; Song et al., 2011). Other studies, however, have found that the effects of the use of EHRs may vary considerably and may not increase the likelihood that a patient with multiple chronic conditions (as SUD patients may present in different medical settings) receives treatment for behavioral or mental health treatment (Garg et al., 2005; Harman et al., 2012).

Information exchange and knowledge dissemination represented by implementation of EHRs may be new activities for SUD treatment providers (Fields et al., 2014; Hingson et al., 2012; Madras et al., 2009). Besides better integrating SUD treatment with the primary health care system, implementation of EHRs may improve SUD treatment organizations' competitive position by facilitating information exchange, supporting better clinical decision making, and enhancing fee-for-service billing capabilities (Buck, 2011; Ghitza et al., 2011; Molfenter et al., 2012). Although many SUD programs have some level of information technology in place, the extent of its interoperability with other health care organizations is unclear (Wisdom et al., 2011).

Research suggests that many SUD treatment centers seem to be slowly progressing toward meaningful use of EHRs (Molfenter et al., 2012). Organizational variables may provide substantial insights about SUD treatment center implementation of process and technological innovations (Knudsen & Roman, 2004; Rogers, 2003). Although exam-

ined in other organizational contexts (Klein et al., 2001), the role of organizational variables in explaining levels of implementation of EHRs has not been examined in SUD treatment organizations.

Organizational variables that may facilitate or hinder implementation of innovations in health services may be categorized as part of the inner and outer settings of organizations (Damanpour, 1991; Damschroder et al., 2009; Greenhalgh et al., 2004; Kaplan et al., 2010). The outer setting describes the organization's environment and includes such variables as coercive pressures from regulatory bodies or mimetic pressures to look and act like other organizations in the industry (Damschroder et al., 2009; DiMaggio & Powell, 1983). The inner setting describes the operational nature of the organization, including organizational characteristics useful in understanding the implementation of technological advances, such as an organization's strategic orientation (Narver & Slater, 1990; Slater et al., 2006).

Entrepreneurial strategic orientation and EHRs

Strategic orientation is an aspect of the culture of an organization (Venkatraman, 1989), affected by the nature of organizational goals (Ginsberg & Venkatraman, 1985). For example, organizations with a strong customer orientation may emphasize the creation and maintenance of customer value. Others may focus on in-depth assessment of targeted competitors or increasing efficiency throughout their value chain (Chatzoglou et al., 2011). Different types of strategic orientation are not mutually exclusive (Chatzoglou et al., 2011). Strategic orientation may also affect the extent of investment in and adoption of new information technology (Ginsberg & Venkatraman, 1992).

An organization's ESO may determine the extent and approach taken in responding to opportunities (Gupta & Pandit, 2012). Organizations with higher levels of ESO are more likely to engage in actions such as implementation of systems and processes that provide a competitive advantage within an industry (Dess et al., 1997; Ginsburg & Venkatraman, 1992; Gupta & Pandit, 2012). For example, within the healthcare field, previous research found that nursing homes with higher levels of ESO were more likely to seek new expansion opportunities after publication of their quality data (Zinn et al., 2008). The findings of other studies suggest that SUD treatment centers that use computer technology to facilitate patient care and billing may have competitive advantages in attracting and retaining patients (Ducharme et al., 2005).

ESO has been defined as including the dimensions of innovativeness, proactivity, competitiveness, and risk taking (Lumpkin & Dess, 1996). Innovativeness reflects a tendency to engage in and support experimentation, creative processes, and departure from existing technologies or practices (Gupta & Pandit, 2012). Proactivity reflects an emphasis on anti-

pating and pursuing new opportunities and taking initiative to assess and meet future needs of current and potential customers (Gupta & Pandit, 2012; Lumpkin & Dess, 1996). Competitiveness reflects willingness to be unconventional and may include identifying the need to do things differently, redefine services, or change the scope of operation to gain competitive advantage (Gupta & Pandit, 2012). Risk taking involves the commitment of resources to uncertain endeavors (Lumpkin & Dess, 1996). For example, smaller independent ventures (such as many SUD treatment centers) may be forced to rely heavily on calculated risk taking to overcome barriers to survival and growth.

In health care organizations, slack organizational resources can be applied to patient care and/or improvement of management processes (Picone et al., 2003). Higher levels of slack resources may enable an SUD treatment provider to better exercise an ESO in order to implement EHRs. Conversely, resource limitations may reduce the impact that ESO may have on the implementation of EHRs because a large proportion of organizational resources must be directed at keeping up with immediate demands of patient treatment. Previous studies of SUD treatment providers found that the level of slack resources measured as full-time equivalent (FTE) employees per patient within a treatment organization may strengthen the relationship between strategic management practices and organizational performance (Fields et al., 2012).

Given the limited research concerning the relationship of organizational variables with strategic investments such as EHRs, this study was exploratory in nature. However, we anticipated that the four components of ESO (innovativeness, proactivity, competitiveness, and risk taking) would be positively related to the extent of meaningful use of EHRs by SUD organizations (study hypothesis 1). Furthermore, based on previous studies, slack resources such as more full-time employees per patient in treatment are likely to increase the relationship of the components of ESO with the extent of implementation of EHRs (study hypothesis 2).

Method

Sample and procedures

The role of ESO was examined in a national sample of SUD treatment providers examined in the National Treatment Center Study (NTCS). In the NTCS, the organization is the unit of analysis. The NTCS focuses on samples of these specialty organizations available in communities, excluding counselors in private practice, halfway houses, transitional living facilities, programs offering only methadone maintenance, court-ordered driver education classes, and providers located in correctional and Veterans Administration facilities. The organizational data collected in the NTCS were provided through face-to-face interviews with

administrative and clinical directors of treatment centers acting as key informants. Data about internal management practices and patient-focused quality improvement practices were provided by the administrative director. Information about patient care was provided by the clinical director. Key informants such as these have been used to describe organizational variables in SUD treatment centers (Fields et al., 2012; Phillips, 1981). The tenure of the key informants in the organizations covered by the current study was sufficient (more than 8 years on average) to suggest that these managers were knowledgeable about the areas being studied (Fields & Roman, 2010; Kumar et al., 1993). All participants provided written informed consent, and the study protocol was reviewed by the University of Georgia's Institutional Review Board.

The data used in this study were obtained during 2009–2011 from SUD treatment providers who obtain 50% or more of their revenue through billings of patients or third-party payers, such as private insurance companies, Medicaid, or Medicare. Treatment centers that must compete for more than half of their revenue have been studied longitudinally within the NTCS for more than 15 years. The original sample was selected by stratifying counties by population size, followed by the use of treatment directories to enumerate facilities in each stratum. Treatment centers were then randomly selected within each population stratum. Selected centers were screened to ensure that each prospective participant met eligibility criteria for sources of revenue. Organizations screened as ineligible were replaced by random selection from the same population stratum. The sample for this study contained 327 SUD treatment organizations; 83% of these entities had participated in previous data collections. Because of missing responses on the dependent variable, the sample used for analysis contained 317 organizations. The survey instruments used in the NTCS are updated in each data collection period. The data covering meaningful use of EHRs used in this study were designed into the survey instruments used in the 2009–2011 data collection.

Measures

Meaningful use of electronic health records. This variable was measured as the four major components of meaningful use (Jha, 2010), which include health information exchange, collection and maintenance of patient records, support for clinical decisions, and production of summary documents for assessing quality of care. Each item was measured dichotomously (1 = yes, 0 = no). Health information exchange was measured with a two-item scale describing whether patient records can be transferred electronically when patients are referred to different levels of care or to another service organization ($r = .58, p < .01$). The mean for the two-item scale was .29 (range: 0–1). Collection and maintenance of patient

records was measured by three items describing whether patient admission interviews and data about patient progress are entered directly into a computer database and patient-related records of all kinds are computerized ($\alpha = .69$). The mean for the three-item scale was .55 (range: 0–1). Support for clinical decisions was indicated by two items describing whether computerized data are used in clinical decisions and whether data about patient progress from a computer database are routinely used to aid treatment team decisions ($r = .63, p < .01$). The mean for the two-item scale was .55 (range: 0–1). Summary documentation was indicated by two items describing whether computer-generated reports are used by the center's administrators for decision making and for program management ($r = .47, p < .01$). The mean of the two-item scale was .64 (range: 0–1).

A factor analysis of these four components of meaningful use employing the MINRES procedure in LISREL 8.80 (Jöreskog, 2003; Jöreskog & Moustaki, 2001) showed that the four variables were related to a single second-order factor (average $t = 12.15, p < .01$). To measure the extent to which EHR implementation met the full meaningful use standard, the four components were combined to form a single composite measure of meaningful use of EHRs. The composite measure was calculated as the mean of the four scales measuring each of the components.

Entrepreneurial strategic orientation. Treatment organization ESO was operationalized using four dimensions suggested by Lumpkin and Dess (1996). Innovativeness was measured by a four-item scale ($\alpha = .69$), which described the extent to which the organization has adequate computer equipment and technical support, the Internet is used for staff development, and center staff are comfortable using computers. Proactivity was measured by a four-item scale ($\alpha = .75$) indicating the extent to which the organization believes it is important to anticipate patient sources, monitor changes in substance use patterns in the local market, perform market research, and develop long-range financial plans. Competitiveness was measured by a scale of 10 items ($\alpha = .70$), which described the extent to which the organization measures quality of treatment, financial performance, time required to complete patient intake, and satisfaction levels of referral sources and third-party payers. Risk taking was measured as a five-item scale ($\alpha = .80$), which covered the importance placed on having above-average utilization rates, financial condition, rate of growth, and below-average operating costs.

Each of these components of ESO was calculated as the mean of the items. Although other studies have suggested that the four dimensions of ESO may be related to a second-order factor, these components may vary independently (Lumpkin & Dess, 1996). Thus, we retained the use of all four separate ESO components in our multivariate analysis. The items comprising the indicators for meaningful use of EHRs and for ESO are shown in Table 1.

Discriminant validity

We conducted a confirmatory factor analysis to examine empirical evidence for the distinctiveness of the two major variables, meaningful use of EHRs and ESO. A two-factor model with the four indicators linked to each latent variable fit the data well, $\chi^2(19) = 52.58, p < .05$; root mean square error of approximation (RMSEA) = .07; normed fit index = .97; goodness of fit index = .99. We then examined alternative two-factor models assigning ESO indicators to the meaningful use latent variable, as well as a one-factor model. The best-fitting alternative was a two-factor model in which innovativeness was assigned to meaningful use of EHRs. However, the fit of this model was worse than the fit of the two-factor model with innovativeness assigned to ESO, $\chi^2(19) = 54.58, p < .05$; RMSEA = .08; $\Delta\chi^2 = 2.0$. These results suggest that the measures of ESO and meaningful use of EHRs described above are empirically distinct in the study sample.

Slack resources. The level of slack resources within each treatment organization was measured as the ratio of total FTE employees in the center to the average patient census across all modalities of residential/inpatient and outpatient treatment offered.

Control variables. We controlled for organizational variables that previous studies have found were related to innovation adoption by SUD treatment organizations (Ducharme et al., 2007; Fields & Roman, 2010; Fields et al., 2012; Knudsen et al., 2011; Roman et al., 2006). These variables, the rationale for their possible effects on implementation of EHRs, and their indicators were as follows:

Organizational size was controlled for because larger organizations may have more discretionary resources to devote to EHR implementation. Size was measured as the number of FTE employees transformed to its natural log.

Hospital-based was controlled for because treatment centers based in or affiliated with a hospital may already be using the hospital's EHR infrastructure. This variable was coded 1 if the program was based in a hospital and 0 if not.

Accreditation by a national organization was controlled for because accredited SUD treatment organizations may feel normative pressures to implement EHR systems. Accreditation was coded 1 if the center was accredited and 0 otherwise.

Percent fee-for-service revenue was controlled for because the uncertainty inherent in greater reliance on third-party billings may create a perceived need for SUD treatment organizations to implement electronic patient records as a means to more accurately measure services delivered and improve billing efficiency and reliability. The percentage of annual revenue from fee-for-service sources (health insurance, self-paying clients, Medicaid, Medicare) was provided by the administrative director.

TABLE 1. Items used to measure meaningful use of electronic health records and entrepreneurial strategic orientation

Meaningful use of electronic health records (responses to all items are yes = 1 or no = 0)	
Information exchange	
1. When patients are referred to another level of care, their records can be transmitted electronically.	
2. When patients are referred to another service organization, their records can be transmitted electronically.	
Maintenance of patient records	
3. Data from patient interviews are entered directly into the computer database system.	
4. Patient-related paperwork is transferred into the computer record system.	
5. Data about patient progress are routinely entered into the computer database.	
Clinical decision support	
6. Computerized data are used in clinical decision making.	
7. Data about patient progress are routinely drawn from the database to aid decision making in treatment team meetings.	
Summary reporting	
8. Computerized data are used for decision making about program management.	
9. The computer system is programmed to produce reports that are used routinely by this center's administrators for decision making.	
Entrepreneurial strategic orientation (responses were 0 = not at all true/important/none to 5 = very true/very important/very great).	
Innovativeness: We would also like your opinion on additional computer-related issues.	
1. We have enough computer equipment in this program for staff to use.	
2. We have adequate technical support to manage our computer needs.	
3. We utilize the Internet for the professional development of staff.	
4. Staff here feel comfortable using computers.	
Proactivity: How important are each of the following in this center's strategic planning?	
1. Anticipating where patients will be coming from in the long term	
2. Monitoring changes in the prevalence, type, and distribution of substance use problems in the market	
3. Market research	
4. Long-term financial planning for this center	
Competitiveness: To what extent does the center engage in the following activities?	
1. The quality of treatment at this center is regularly measured.	
2. The center's financial performance is regularly measured.	
3. We regularly measure the amount of time required to complete intake.	
4. Complaints from referral sources are logged and regularly evaluated.	
5. The satisfaction of referral sources is regularly evaluated.	
6. Complaints from client organizations are logged and evaluated.	
7. Measurement systems are in place to monitor quality outcomes.	
8. Data are collected from key personnel at referral sources to determine their level of satisfaction.	
9. Data are collected from third-party payers to determine their level of satisfaction with this center's services.	
10. Data are collected from patients to determine their level of satisfaction.	
Risk taking: How important are the following goals to this center's strategic decisions or commitments of a long-term nature?	
1. Generating above-average revenues	
2. Achieving below-average costs of operation	
3. Achieving above-average occupancy rates (percent capacity)	
4. Achieving an above-average rate of growth	
5. Achieving above-average liquidity and financial strength	

Offering comprehensive care was controlled for because SUD treatment centers providing comprehensive care may be more likely to undertake other innovations such as EHR implementation (Ducharme et al., 2007). Comprehensive care measures the extent that a treatment provider uses evidence-based practices including medication in core SUD treatment and provides a variety of wraparound services (such as medical care, legal services, etc.). It was measured using an index covering both core SUD treatment and wraparound services (see Fields et al., 2012, for details on services included).

Analytic strategy

The study hypotheses were tested by estimating the parameters of moderated multivariate linear regression models with meaningful use of EHRs as the dependent variable. The first model assessed the direct relationships of the four components of ESO with meaningful use after entry of the

control variables. To assess moderating effects, the second model included four variables, each of which modeled the interaction of each ESO component with slack resources. Each of these variables was calculated as the product of an ESO component with FTE staff per patient.

Results

The means, standard deviations, and zero-order correlations of the variables are presented in Table 2. On average, the SUD treatment centers in the sample had implemented approximately 50% of full meaningful use of EHRs. Thirty-eight centers (12%) had implemented none of the components of meaningful use, and 45% had implemented fewer than half of the meaningful use components. Organizations in the study sample contained an average of 22 FTEs; 31% were hospital-based treatment programs; 61% were accredited by a national organization. These organizations obtained

TABLE 2. Means, standard deviations, and correlations of study variables ($N = 317$ treatment organizations)

Variable	<i>M</i>	<i>SD</i>	Correlations										
			1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. EHR meaningful use	0.51	0.31	—	.23**	.35**	.13**	.09*	.01	-.04	.20**	-.04	.14**	.08
2. Innovativeness	4.10	0.79		—	.22**	.27**	.15**	-.06	.08	.02	.09*	-.03	.04
3. Proactivity	3.85	0.84			—	.50**	.42**	.07	-.11*	.21**	-.08	.21**	.08
4. Competitiveness	4.15	0.76				—	.26**	.08	-.01	.25**	.02	.15**	.01
5. Risk taking	3.99	0.83					—	.03	-.04	.06	-.08	.06	.03
6. Size (ln FTEs)	3.08	0.86						—	-.05	.01	.01	.12*	.12*
7. Hospital based (%)	31	46							—	.32**	-.15**	-.04	.12*
8. Accreditation (%)	61	49								—	.03	.12*	.10*
9. Percent fee revenue (%)	72.5	36.4									—	-.13*	-.18**
10. Comprehensive care	13.8	3.31										—	.04
11. Slack resources (FTEs/patient)	0.14	0.41											—

Notes: EHR = electronic health record; FTE = full-time equivalent.

* $p < .05$; ** $p < .01$.

an average of 72.5% of revenue from fee-for-service billings, offered comprehensive care at an average level of 13.8 (63% of the maximum index score of 22), and averaged 0.14 FTEs per patient (7 patients per FTE). All four of the components of ESO had significant zero-order correlations with meaningful use of EHRs ($mean\ r = .20, p < .01$), and these components were significantly intercorrelated ($mean\ r = .30, p < .01$).

Tests of hypotheses

Hypothesis 1, which predicts that, after other relevant organizational variables were controlled for, SUD treatment centers' ESO components will be positively related to meaningful use of EHRs, was tested by estimating the parameters

of a multivariate linear regression model. The regression model is shown in Table 3.

The control variables accounted for 7% of the variance in meaningful use of EHRs. Accreditation by a national body and offering comprehensive care were both positively related to meaningful use of EHRs. Addition of the components of ESO to the regression model following the control variables significantly improved fit of the model ($\Delta R^2 = .12, p < .01$). Three of the four components of ESO had significant relationships with meaningful use of EHRs. Innovativeness and proactivity were both positively related to meaningful use, whereas, surprisingly, competitiveness had a significant negative relationship. Overall, the net relationship of ESO was positive, with the effects of ESO accounting for approximately twice as much of the variation in meaningful use as

TABLE 3. Regression models predicting meaningful use of electronic health records ($N = 317$ treatment organizations)

Independent variables	<i>b</i> (<i>SE</i>)	β	<i>b</i> (<i>SE</i>)	β
Control variables				
Size (ln FTEs)	-0.01 (0.02)	-0.02	-0.01 (0.02)	-0.01
Hospital based	-0.08 (0.04)	-0.11	-0.05 (0.04)	-0.08
Accreditation	0.14 (0.04)**	0.21**	0.11 (0.04)**	0.17
% billed revenue	0.01 (0.01)	0.02	-0.01 (0.01)	-0.01
Comprehensive care	0.02 (0.01)*	0.11*	0.01 (0.01)	0.08
Slack resources	0.06 (0.04)	0.08	0.03 (0.04)	0.04
$\Delta R^2 = .07^{**}$				
Entrepreneurial strategic orientation				
Innovativeness			0.08 (0.02)**	0.21
Proactivity			0.12 (0.03)**	0.33
Competitiveness			-0.05 (0.03)*	-0.13
Risk taking			-0.03 (0.02)	-0.07
$\Delta R^2 = .12^{**}$				
Interactions with slack resources				
Innovativeness $\times$ Slack Resources			-0.33 (0.14)*	-2.09
Proactivity $\times$ Slack Resources			0.23 (0.22)	1.42
Competitiveness $\times$ Slack Resources			0.40 (0.22)*	2.17
Risk Taking $\times$ Slack Resources			-0.04 (0.18)	-0.18
$\Delta R^2 = .03^*$				

Note: FTE = full-time equivalent.

* $p < .05$ (two tail); ** $p < .01$ (two tail).

FIGURE 1. Relationship of innovativeness with meaningful use for different organizational resource levels ($N = 317$); EHR = electronic health record

FIGURE 2. Relationship of competitiveness with meaningful use for different organizational resource levels ($N = 317$); EHR = electronic health record

the control variables. Taken together, these results partially support Hypothesis 1.

Hypothesis 2, which predicted that higher levels of slack resources would increase the strength of the relationship of the components of ESO with meaningful use of EHRs, was tested by computing four new variables that model the interaction of organizational resources with each of four components of ESO (Bobko, 2001; Edwards, 2009). Each new variable is the product of each ESO component with FTEs staff per patient. These variables were entered as an additional third block into the regression model shown in Table 3. This hierarchical approach to testing for moderating effects is considered a conservative approach (Edwards, 2009). The variables modeling the interaction of organizational resources with innovativeness and competitiveness both had significant effects as shown in the lower portion of Table 3. Higher levels of slack resources increased the strength of the relationship of competitiveness with meaningful use of EHRs. Surprisingly, higher levels of slack resources reduced the strength of the relationship between technical innovativeness and meaningful use of EHRs. Hypothesis 2 was therefore partially supported. These interactions are shown graphically in Figures 1 and 2. In both cases, high slack resource levels were calculated as the mean level in the sample plus 1 *SD*, and low resource levels were calculated as the mean slack resource level minus 1 *SD*.

Discussion

This study examined the extent to which implementation of meaningful use of EHRs by SUD treatment organizations is related to the level of the organization's ESO. It also examined the extent to which the relationship of the compo-

nents of ESO with implementation of EHRs differs when an organization has higher or lower levels of slack resources. In a diverse national sample of more than 300 treatment organizations, two of four components of ESO were positively related to meaningful use of EHRs. ESO components also accounted for nearly twice as much variance in the extent of EHR implementation as other structural and treatment service-related variables.

At the same time, organizational variables explained 19% of the variance in meaningful use implementation of EHRs, suggesting that other factors not specified in the analysis may be at work or that the deviation in the effects of the organizational variables differs greatly across SUD treatment providers. The SUD treatment industry largely comprises smaller organizations, as illustrated by our sample mean size of 22 FTEs. The implications for entrepreneurial strategic approaches in these SUD providers may take on many forms, only some of which include management and systems changes inherent in implementation of EHRs.

The ESO components of organizational innovativeness and proactivity were both positively related to meaningful use of EHRs. Although risk taking had significant zero-order correlations with meaningful use, its independent relationship in the multivariate model was not significant. The contribution of risk taking to EHR implementation may simply be better captured by the other components of ESO. Surprisingly, across the sample, competitiveness had a significant negative direct relationship with meaningful use of EHRs. In our operationalization, competitiveness was measured as the extent to which the organization assesses both its performance and the satisfaction levels of third-party payers and referral sources. On average, SUD treatment providers who are highly reliant on billed revenue, such as those in the study sample, may see limited

short-term payoff from the additional resource commitment required to implement EHRs. These SUD providers may seek competitive advantage in other areas with more immediate payoff, such as service delivery approaches. Thus, if competitiveness is positively related to the implementation of other innovations, these efforts may assume priority claims on available organizational resources. Thus, efforts devoted to other aspects of competitiveness may tend to diminish the relationship with the implementation of EHRs.

In addition to examining the direct relationship of ESO with meaningful use of EHRs, our inquiry also examined the moderating effects of organizational slack resources. Previous studies of SUD treatment organizations suggested that higher levels of organizational slack resources would increase the relationship between components of ESO and meaningful use, largely because additional resources may make it easier for treatment providers to supply the necessary staff time and effort required to develop and implement such innovations as EHRs. This analysis showed that the negative relationship of competitiveness with meaningful use of EHRs in the entire sample was actually positive for treatment centers with higher levels of staffing per patient (Figure 2). Having more resources available may make it possible for treatment organizations to invest in EHRs as well as in other areas of innovations as a strategy that improves the center's competitive position. Those centers with lower levels of resources may have to focus a greater portion of resources on more immediate term competitive challenges, such as patient care. EHR implementation may be viewed either as an undertaking whose benefits to an SUD treatment provider may be realized only over an extended period or as an undertaking with questionable payoffs in improved patient care.

In a similar fashion, the analysis of moderating effects showed that the relationship of technical innovativeness with meaningful use of EHRs was smaller for centers with higher levels of resources available (Figure 1) but larger for those with lower levels of staffing per patient. Our operationalization of innovation focuses on the computer capabilities of SUD organizations. When organizational resources are scarce, SUD treatment providers may direct internal technical capabilities toward EHRs as a mechanism by which the organization can gain more resources through better capture of services provided as well as more efficient billing capabilities. When resources are more plentiful, SUD organizations may apply their technical capabilities to other areas and see less urgency or payoff in EHR implementation. It is also possible that treatment organizations with higher levels of slack resources may already view their position in the environment as more secure and thus see less need to engage in EHR implementation as a source of competitive advantage. Alternately, SUD treatment providers with more slack resources may focus resources on innovations in treatment quality, which some studies sug-

gest may not be improved by more extensive use of EHRs (Harman et al., 2012; McCormick et al., 2012).

Strengths, weaknesses, and suggestions for future studies

The examination of the relationship of ESO with implementation of meaningful use of EHRs in a nationally representative sample of more than 300 SUD treatment organizations strengthens the results. There were some limitations introduced by measurement challenges inherent in organizational-level research. For example, the measure for risk taking is based on ratings of the importance of several organizational objectives that might be seen as competing with one another, such as generating above-average revenues while achieving below-average costs. In addition, descriptions of both meaningful use of EHRs and ESO were provided in a single interview by the administrative director of each treatment provider. Consequently, it is possible that the relationships among these measures could be inflated (Conway & Lance, 2010).

However, as administrative leaders of each organization, these directors are arguably the most knowledgeable source of information about both strategic approaches and the extent to which EHRs are implemented by the organization. Also, as noted by an anonymous reviewer, program director and staff reports about the use of evidence-based counseling practices may differ.

Last, because SUD organizations varied in their organizational infrastructure, particularly in clinical service delivery, the program administrator was the single position consistently present across all organizations. In this study, entrepreneurial orientation as reported by the program director may reflect his or her entrepreneurial perspective, which may be at variance with the strategic actions taken at other organizational levels.

Future studies of treatment centers should obtain more detailed data about the way that EHRs are actually implemented within SUD treatment environments. As Denis and colleagues (2002) have noted, the gap between the requirements of specific techniques and prevailing organizational practices may determine the extent to which a technique is altered to fit organizational circumstances.

Conclusions

From a policy and practice perspective, our results indicate that providing support for developing higher levels of ESO within SUD treatment centers may increase the level of meaningful use of EHRs. In particular, personnel in SUD treatment organizations should be trained, encouraged, and supported to be innovative, proactive, competitive, and calculated risk takers. The requirements for meaningful use of EHRs will continue to increase in scope and complexity in the future, suggesting that policies and practices embedded

in training and educational efforts that encourage and support such strategic approaches with SUD treatment organizations may be essential for the closer integration of SUD treatment with primary medical care. As the full implications of the Affordable Care Act become apparent, the smaller organizations that dominate the structure of the SUD treatment industry may experience extreme institutional and regulatory pressures not only to implement EHRs but also to undertake other nontraditional activities that satisfy regulatory demands (Buck, 2011; Fields et al., 2014). Adopting more entrepreneurial strategic perspectives may be a necessary step for SUD treatment centers to anticipate and meet the challenges of the complex factors arising from new patients with resources available for behavioral health care through implementation of the Affordable Care Act (Buck, 2011).

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