Toward a Way to Enhance Organizational Effectiveness in the Defense Sector: Associating CVF with DEA

Deokro Lee

Abstract

As one of the performance indicators, organizational effectiveness has been an impending issue in business and governmental organizations, but the relevant literature and practice have been characterized by controversy and confusion. Practically, there have been a lot of attempts to define and assess organizational effectiveness. However, it does not seem to be proving very successful. Performance, efficiency, productivity, excellence, and effectiveness itself are frequently-used connotations for organizational effectiveness in both academic and practical realms. Moreover, our contemporary public, private, and nonprofit practitioners focused on narrowly-drawn models that emphasize efficiency and productivity at the expense of other dimensions of effectiveness. This study employs the Competing Values Framework, which systematically integrates a variety of theoretical approaches in one framework, as the theoretical foundation to access the organizational effectiveness. Also, by combining the Competing Values framework with a newer analytic tool, Data Envelopment Analysis, this study reinvigorates a wholistic model of organizational effectiveness. This study utilizes the unique model to measure the effectiveness of military hospitals. The finding of this study shows that the framework and the tool are both very useful, and that they work well in combination. The article concludes with suggestions for their continued use in subsequent effectiveness studies both in and out of the defense sector.
Introduction

In this performance-oriented era, organizational effectiveness is considered as an impending issue, both in and out of the defense sector. As the last shield of national defense in wartime, the military keeps national security for socio-political stability and economic growth in peacetime. The Korean military has spent almost 16 percent of the government budget to maintain its readiness, but is now confronting a new situation that compels it to ask for more money to accomplish the Defense Reform Policy of 2005. The Defense Reform Policy is intended to strengthen the readiness of the military with cutting edge armaments at the expense of reducing the number of military personnel until 2020.

However, the people expect the military to be more efficient and effective, rather than merely providing the military with all the money it wants. This means the military must of necessity find ways to achieve organizational efficiency and effectiveness anticipated by the people. Indeed, the military has tried various ways to improve its own effectiveness, but the fact is that it is still suffering from a lack of systematic methods and theoretical frameworks. The most important reason for this is that they are mired in controversy over the studies and theories of organizational effectiveness in both academic and practical realms.

In general, this situation of variety and controversy reflects the range of theoretical orientations found in the broader field of organizational studies. Indeed, as Cameron has argued, the only consensus on organizational effectiveness is that there is no consensus in organizational effectiveness.1 Under the current circumstances of the academia and practical arenas, it is unlikely that consensus will be achieved soon regarding definitions, a set of conventional indicators, or a general theory of organizational effectiveness. As Cameron and Whetten declared, “no one approach to effectiveness is inherently superior to another,”2 and they

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2 Kim S. Cameron and David A. Whetten, “Organizational Effectiveness: One
consequently suggested developing a framework for assessing effectiveness rather than developing additional theories of effectiveness.3

Following the advice of Cameron and Whetten, this study explores a new approach, combining a well-established theoretical scaffold, the Competing Values Framework (CVF)4 and a new device, Data Envelopment Analysis (DEA), to examine performance data. This study used the combined method in a study of effectiveness among Korean military hospitals under the Armed Forces Medical Command, generated findings that confirm the efficacy of combining the framework and the tools, and developed suggestions to use in combining them for subsequent evaluations of organizational effectiveness in and out of the defense area.

Among diverse organizational effectiveness theories, the CVF admits that there cannot be a universal model of organizational effectiveness.5 In this framework, the representative effectiveness models, such as the rational goal approach, systems approach, and internal process approach, which interrelate and culminate in the competing values, were integrated.

Among a group of analytic tools that can be applied in the field of organization studies, DEA’s capability to identify best practice organizations provides some basis for testing theories about effective organizations.6 DEA is a useful tool to assess the relative effectiveness of homogeneous organizations with multiple inputs and multiple outputs. In this vein, Cameron’s findings from research about school units that

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utilize multiple inputs to produce multiple outputs suggest DEA as an appropriate way to measure comparative organizational effectiveness.\textsuperscript{7}

As Lewin and Minton pointed out, “It is clearly an empirical question whether specific organizational settings are more appropriate for certain organizational effectiveness criteria.”\textsuperscript{8} They also argued that empirical support for such relationships would provide the basis for external validity of organizational effectiveness theories. This study provides empirical support for the external validity of the CVF by operationalizing specific effectiveness criteria with hard data. Besides, by combining CVF and DEA, this study illustrates the effectiveness of a novel management device and offers substantial evidence that the device produces results that both middle managers and executives can utilize.

**Background**

Since 2001, the Operation Evaluation Division of Analysis and Evaluation Directorate of the Ministry of National Defense (MND) has evaluated a lot of major defense projects which spent operation and maintenance budget to improve the ministry’s performance accountability. This evaluation process was designed to increase MND’s efficiency and effectiveness, and public content with MND.

However, in the process of evaluating the defense projects, the directorate suffers from a lack of systematic tools to measure performance and accountability of organizational units, especially, ex post evaluation tools. The directorate asked the Korea Institute for Defense Analyses (KIDA) to develop performance measures for organizational units under MND, especially, military hospitals. In recent years, MND, attempting to act on behalf of taxpayers, has increasingly moved to measure its own performance. All government-supported institutions and ministries have been under increasing pressure to assess their


effectiveness in accomplishing goals. The major forces behind the assessment movement in Korea are the legislative and executive branches of central government, as well as the general taxpayers.

The main difficulty with performance evaluation is closely related to the evaluation of organizational effectiveness. Effectiveness per se is extremely difficult to define and measure. In addition, it is not clear which indicators can be used to assess effectiveness. Furthermore, as Cameron has noted the difficulties in defining organizational effectiveness generally, this study should anticipate a lack of consensus on reliable and valid methods to evaluate the organizational effectiveness in general, and that of hospitals in both civilian and military society in particular.9 This study addresses this void by suggesting a comprehensive approach for assessing the effectiveness.

**Organizational Effectiveness: Theoretical Confusion**

Emphasizing the importance of organizational effectiveness, Richard Hall asserts, “In essence, the outcome of structural arrangements, processes such as decision-making and leadership, and dealing with the environment are designed to contribute to organizational effectiveness.”10

Despite the intellectual and practical importance of organizational effectiveness in organizations studies, there is still much confusion and ambiguity on the subject. For example, one can argue that an organizational structure is effective to the extent that the organization achieves the core activities with outputs that are greater than the costs. From the perspective of internal processes, the organization is effective to the extent that the members are operating in harmony in information flow, decision-making procedures, and problem-solving practices.11 Both structure and process are important for organizational effectiveness. As

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9 Cameron, “Effectiveness as Paradox,” pp. 539–53.
Campbell argued, diverse value judgments about the nature, the goals, and the processes of organizations have led to theoretical complexity in the field of organizational effectiveness studies. Moreover, as noted above, Cameron concluded that due to the inherent paradoxical nature of organizational effectiveness, it follows that the only consensus is that there is no consensus about the concept of organizational effectiveness. Therefore, any assessment of the effectiveness of an organization must be simultaneously attentive to structure, process, and various contexts in order to attain practical and theoretical generalization.

Theoretical Development of Organizational Effectiveness

Throughout the historical evolution of organization studies, representative organizational theories such as the rational goal perspective, the natural systems perspective, and the open systems perspective were dominant in the studies of organizational effectiveness. The evolution of organizational effectiveness theories, however, offers a variety of modifications to these three basic perspectives. Fundamentally, the development of theories of organizational effectiveness has paralleled the development of theories of organizational studies, and has weaved in and out of the theoretical frameworks with more specific deployments. Unlike the development of theories in organizational studies,

13 Cameron, “Effectiveness as Paradox,” pp. 539–53.
14 The expressions of “open system” and “open systems” have been used interchangeably in the writings of various authors. This study uses both expressions to be consistent with the various scholars whose works are represented here.
the field of organizational effectiveness studies has retained a long-held tension among existing theories. That is, theories on organizational effectiveness continue to compete rigorously with each other, and this contention results in fundamental theoretical disarray in organizational effectiveness studies.

This study contends that theoretical disarray about organizational effectiveness derives fundamentally from the tension among prominent theories; that is, each of them pays attention to different characteristics of organizational effectiveness. The competing theories make different assumptions about timeframes and the types of organizational activities to be observed, and these varying assumptions have inhibited their collective efforts to establish a general organizational effectiveness theory.

**Rational Goal Theory**

Whatever it has been referred to as, the most conventional approach to the organizational effectiveness study is the rational goal approach. In terms of rational goal perspective, organizational effectiveness can be said to refer to the extent to which an organization achieves its goal or purpose. Thus organizational effectiveness inevitably relates to how we describe the goal or purpose of the organization. In light of the diversity of organizational goals and purposes, one can assume that organizational effectiveness would pursue a multiple and changing direction, rather than one that is unitary and constant.

**Systems Theory: Integration of Natural System and Open Systems**

As a representative approach to organizational effectiveness, the systems approach assumes that if an organization is larger than some

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specific size, it is difficult to single out and meet succinct organizational goals. This approach argues that realization of the goals of the system is just one of several important needs to which the organization is oriented. Thus, organizations become their own ends.\textsuperscript{17} Therefore, organizational effectiveness can be assessed by checking internal consistency, ability to exploit resources from the environment, and the like.\textsuperscript{18} In addition, this approach asserts that organizational effectiveness mainly depends on the match between organizational characteristics and environmental conditions.\textsuperscript{19}

Scott noted a conspicuous connection between the open system model and Gouldner’s natural system model of organizational effectiveness.\textsuperscript{20} Scott’s model draws substantially from system resource theory by Yuchtman and Seashore and contingency theory,\textsuperscript{21} both of which emphasize resource acquisition from the environment. Therefore, the systems theory can be said to consist of human relationship and administrative processes within the internal activities of organizations, and interactions of organizations with their environments.\textsuperscript{22}

\textsuperscript{17} Gouldner, “Organizational Analysis,” pp. 400–28.
Multiple-Constituency Theory

The multiple-constituency theory has been proposed as an alternative to the goal and system-resource theories for the studies of organizational effectiveness.\(^23\) While there are several different perspectives within the multiple-constituency theory such as the relativist view,\(^24\) the social justice view,\(^25\) the power view,\(^26\) and the evolutionary view,\(^27\) the overall multiple-constituency view regards organizations as systems that generate different assessments of effectiveness from different constituencies by their own vantage point of view.\(^28\)

Competing Values Framework

As shown, the various approaches that have been adopted by organization scholars tend to emphasize specific attributes or organizational

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aspects in one way or another. Campbell suggests that it is better for organizational effectiveness to develop organization-specific models based on clear assumptions that are appropriate to the specific organizational setting. Most scholars, however, prefer not to choose only one model among various alternatives to explain organizational phenomena, primarily because each of these organizational effectiveness approaches has certain strengths and weaknesses at the same time.

According to Hall, contradictions about organizational effectiveness necessarily occur in any given organization for several reasons. First, organizations face multiple and conflicting environmental constraints. Second, organizations have multiple and conflicting goals. Third, organizations face multiple and conflicting internal and external constituencies. Fourth, organizations have multiple and conflicting time frames. Therefore, organizational effectiveness should be concurrently approached from several different points of view.

Therefore, in the process of assessing organizational effectiveness, it is important to consider several constructs such as dimensionality, timeframe, constituency, and value judgment simultaneously. Following this logic, all of the previously mentioned approaches could be used in studies of organizational effectiveness in an eclectic way. As Kirchhoff asserted, however, “trying to view organization effectiveness in a single dimension is much like trying to visualize a cube without depth perception, and the result is distortion.” Thus, whereas each model explicates some aspects of organizational effectiveness, we still need an integrated model to guide us to a more systematic and wholistic understanding.

The competing values framework of organizational effectiveness was introduced by Quinn and Rohrbaugh, based on the recognition that organizations goals are concomitantly pulled in opposite directions by the expectations of multiple constituencies.34 This approach consists of four different organizational models—the rational goal model, the open systems model, the internal process model, and the human relations model. This study regards the competing values approach as integrating the rational goal approach and the natural system approach as elaborated above.

This approach provides the researchers and practitioners with a systematically integrated way to assess organizational effectiveness, and it affords latitude in dealing with various organizational contexts. In addition to its utility in drawing together a variety of theoretical approaches to organizational effectiveness, one of its greatest strengths is that the framework was derived empirically from the participation of a group of expert scholars conversant with the literature on organizational effectiveness.35

The competing values approach is based on three dimensions. The first dimension is about organizational focus, from an internal to an external emphasis. The second dimension is related to organizational structure from stability to flexibility. The third dimension captures the distinction between means and ends (see Figure 1). These three-dimensional spaces lead to four models of effectiveness and eight arenas for scholarly and practical attention. The rational goal quadrant stresses control and external focus, the internal process quadrant highlights control and internal focus, the open system quadrant underscores flexibility and external focus, and the human relations quadrant emphasizes flexibility and internal focus.36

A value judgment is needed to decide which variables are means and which variables are ends.37 Yet all four models are composed of

means and ends for their own purposes, and “means” are the way to achieve the “ends” of the model. As Simon pointed out, means-ends relations are seldom integrated and connected chains for both organizations and individuals. However, this study can identify the relationship from Parsons’ classic definition that an end is a future state of affairs toward which the process of actions, or means, is oriented. Therefore, for purposes of specification, organizational effectiveness can be defined as the degree to which “ends” are achieved by the

“means” of each model. Accordingly, “ends” are the ultimate focus of interest in each model rather than “means.”

It is important to note that although certain pairs of concepts are at opposite locations in value space and paradoxical in nature, this does not necessarily mean that they are empirically opposite and mutually exclusive in real organizational environments. Indeed, an organization might be cohesive and productive or stable and flexible at the same time.

This approach provides a more comprehensive and balanced set of indicators than other frameworks currently in existence. Table 1 summarizes representative approaches in organizational effectiveness studies.

Table 1. Approaches to Organizational Effectiveness

<table>
<thead>
<tr>
<th>Model</th>
<th>Effectiveness Defined</th>
<th>Effectiveness Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational Goal Model</td>
<td>The extent to which goals are accomplished</td>
<td>Productivity, efficiency</td>
</tr>
<tr>
<td>Human Relations, Internal Process, Acquisition of resources from environments</td>
<td>Employee satisfaction, Smooth internal functioning, Acquisition of resources from environments</td>
<td>Morale, cohesion, Stability, control, Resource acquisition, flexibility</td>
</tr>
<tr>
<td>Natural Systems, Open Systems</td>
<td>Satisfaction of all strategic constituencies</td>
<td>Constituencies, Satisfaction</td>
</tr>
<tr>
<td>Multiple Constituency Model</td>
<td>Integration of above definitions’ effectiveness</td>
<td>Change in above criteria over time and space</td>
</tr>
</tbody>
</table>


41 Whetten and Cameron, “Organizational Effectiveness,” pp. 135–53.
Is Organizational Effectiveness Different by Model?

The research questions of study stem from the following considerations: First, this study uses an analytic tool that permits a measurement of the effectiveness of military hospitals based on hard data, rather than perceptions. This is a significant addition to extant effectiveness research that has been undertaken in the CVF tradition, in that previous research has mainly depended on participants’ perceptions. This study suggests, for example, that most existing studies cannot entirely discriminate between actual conditions and actual performance from organizational climate and employee morale. Particularly, this study focuses on the comparative assessment of the military hospitals’ actual inputs and outputs. Second, drawing on various theoretical approaches to effectiveness, this study addresses questions about which approach is most suitable for various organizational settings. For example, some military hospitals are more output-driven than others, while others are more human-focused than others. By using the CVF, this research shows how effectiveness could be defined and determined in a different way by different settings.

As a matter of fact, there are currently few existing empirical studies about organizational effectiveness including defense sector. This research submits that empirical research such as this will spur more research in the field of organizational effectiveness studies and will enable theory building in general, and encourage quantitative approach to organizational performance evaluation in defense sector in particular.

Indeed, theories enable those who are interested in specific social and natural phenomena to specify which elements are relevant to their questions and to make specific assumptions that are necessary for them to understand and explain the phenomena.42 Even though a theory is understood to be tentatively held, subject to empirical falsification,43 as

Campbell suggested, it seems that without theories it is impossible to determine whether one organization is more effective than another.\textsuperscript{44} Since definitions of effectiveness and specific criteria for effectiveness of an organization cannot be justified as universal,\textsuperscript{45} it is important to implement unremitting research that illustrates the rich variety of definitions and criteria, and the complexity of the effectiveness phenomenon. This is an essential rationale for incessant empirical studies of organizational effectiveness.

**Research Methods**

Organizational effectiveness has typically been evaluated through a comparison between similar functions or relatively similar units of organizations.\textsuperscript{46} Traditionally, ratio analysis, including cost-benefit analysis, has been one of the most frequently used methods to evaluate the relative effectiveness of different policy programs. Such analyses have often been applied to assess the relative effectiveness of alternative means of achieving a variety of purposes.\textsuperscript{47} It is generally believed that traditional methods such as Correlational Analysis, ANOVA (Analysis of Variance), and OLS (Ordinary Least Squares) regression have substantial limitations for measuring organizational effectiveness. Data Envelopment Analysis (DEA) was developed to overcome some of the deficiencies of these traditional methods.\textsuperscript{48}

Different from traditional parametric approaches, which focus on the average and estimation of parameters that are associated with a single, optimal regression equation based on central tendency analyses, DEA takes an approach in which each homogeneous organizational unit, called a Decision-Making Unit (DMU), is optimized to its fullest possibility. DEA does this by calculating an optimal performance for each DMU relative to all the other DMUs in the population.

\textsuperscript{45} Cameron, “Effectiveness as Paradox,” pp. 539–53.  
DEA was originally developed for the purpose of efficiency evaluation in Operations Research. However, proponents of DEA have noted to the implications of their efficiency findings on effectiveness considerations,\(^{49}\) and declared that DEA can be further exploited to evaluate organizational effectiveness. Lately, DEA has been applied to a wide range of disciplines in the social sciences, business, and engineering. Current movements that emphasize development of theories of best practice help DEA broaden its terrain.\(^{50}\)

**Data Collection**

Data for this study were collected as part of the study on the effectiveness of Korean military hospitals implemented by the Korea Institute for Defense Analyses (KIDA) in 2005. Using the data, this study examines comparative organizational effectiveness of military hospitals with DEA. This study employs both archival data from Ministry of National Defense (MND) and the Armed Forces Medical Command (AFMC) to assess relationships between inputs and outputs.

The expenditures of military hospitals were extracted from the 2004 annual budget from MND. These data provide expenditure profiles associated with maintenance and operating outlay. AFMC provided activities, staffing, and performance of the military hospitals under its control. These data contain the information conducted by military hospitals in 2004. After collecting data from two sources, these two data sets were merged into one data set, which represents input and output variables of 16 military hospitals for the Data Envelopment Analysis (DEA) modeling.

**Selection of Variables**

Selection of input and output variables to assess the comparative


organizational effectiveness needs careful consideration. The difficulty comes from diversity of definitions of effectiveness, the multiplicity of organizational goals, and variety of approaches to effectiveness as described above. All members of the Operation Evaluation Division of the Analysis and Evaluation Directorate of the Ministry of National Defense (MND) and the author met and discussed twice to decide input and output variables for four models in the CVF. Finally, all of the members reached unanimous agreement of the variables to analyze the effectiveness of the 16 military hospitals based on the CVF. Table 2 summarizes the key variables that this study used in terms of the four competing models.

Table 2. Input and Output Variables by Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Variables</th>
<th>Output Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational Goal</td>
<td>Physicians, Nurses, Pharmacists, Enlisted personnel for medical service, Technical personnel for medical service, IT technicians, Numbers of licensed beds, Maintenance and operation budget, Medical information system budget, Long distance diagnosis system budget</td>
<td>Number of outpatients, Number of inpatients, Number of surgeries (whole/part)</td>
</tr>
<tr>
<td>Open system</td>
<td>Physicians, Nurses, Pharmacists, Enlisted personnel for medical service, Technical personnel for medical service, Numbers of licensed beds, Maintenance and operation budget</td>
<td>Number of public services</td>
</tr>
<tr>
<td>Human Relations</td>
<td>Nurses, Pharmacists, Enlisted personnel for medical service, Technical personnel for medical service, Education budget</td>
<td>Amount of education</td>
</tr>
<tr>
<td>Internal Process</td>
<td>Nurses, Enlisted personnel for medical service, Technical personnel for medical service, IT technicians, Medical information system budget, Long distance diagnosis system budget</td>
<td>Number of outpatients, Number of inpatients</td>
</tr>
</tbody>
</table>
Data Analysis

This study used DEA software named Frontier Analyst 3.0 from Banxia Holdings. This study found it eminently useful for capturing the relative effectiveness of military hospitals in terms of the competing values framework. The extended findings of this study have been reported an annual report for MND; this paper illustrates those results that demonstrates the unique contribution that is achieved by combining the Competing Values Framework and Data Envelopment Analysis.

Research Findings

One of the important purposes of this study is to discover how four different models in the Competing Values Framework (CVF) illustrate the different forms of effectiveness represented in a military hospital. The CVF model supports the idea that there cannot be one universal model of organizational effectiveness. From this standpoint, certain organizational characteristics may be more significantly related to certain organizational settings than others. Additionally, due to differences in the fundamental idea of effectiveness in each model in the CVF, efficiency scores of an organization in each model could be different.

However, inconsistency of efficiency scores of an organizational unit in each model does not necessarily represent that the organization is not effective. For instance, DMU K could be effective in terms of the open system perspective in the CVF, but ineffective in terms of the human relations perspective or vice versa. In this occasion, we could not conclude that DMU K is effective or ineffective. Thus, constituencies

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51 This research used the CCR input-oriented model for the rational goal model and internal process model. Additionally, the CCR output-oriented model was used for internal process model and human relations model. DEA is generally broken down into two representative models; CCR which produces a constant returns-to-scale (CRS) and BCC, which produces a variable returns-to-scale (VRS).

who want to evaluate organizational effectiveness of organizations have to keep in mind that to evaluate effectiveness from one perspective is insufficient relative to the rich information that could be obtained from multiple perspectives.

**Organizational Effectiveness Comparison Among Models**

Shapes of military hospitals’ effectiveness by models. Since the CVF combines four contradictory models in one theoretical framework, it will be useful to know how different they are and how they relate to each other. The basic idea of DEA is to figure out an efficiency frontier from the set of DMUs. Since more than one DMU may stack up evenly at the efficient frontier, all DMUs placed at the frontier are justified as being efficient. Therefore, a DMU’s 100 efficiency score means that DMU is working at 100 percent efficiency. DMUs that lie below the frontier are identified as comparatively inefficient. Table 3 shows 16 military hospitals’ efficiency scores across the four models.\(^5\) This result indicates that there are differences in military hospitals’ effectiveness across the four CVF models.

For example, Unit 1 is evaluated as efficient in terms of rational goal model and internal process model, but it is evaluated as very inefficient in terms of the open system model (0.01) and human relations model (33.59). On the other hand, unit 9 is efficient across all four models. This study found that the 15 units out of 16 units of military hospitals have been judged differently by the four unique models.

Table 3 also shows mean scores from all military hospitals for the four models. Even though each model measured organizational effectiveness of the same military hospitals, the average efficiency scores for each model are different. The lower average efficiency scores in the organizational flexibility focus frame (i.e. open system model: 42.46 percent, human relation model: 41.44 percent) suggest that military hospitals are, in general, more concerned with their mission or goal, and routine internal processes to achieve their goal.

These results are plausible when we remember that military work

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\(^5\) The full results can be provided through direct contact with the author. They are too expansive to be presented within the space parameters of this article.
itself tends to be routine rather than dynamic and flexible. The military is the most control-oriented organization and is operated under a command chain. Therefore, compared to the flexible focus models, the lower average efficiency scores of the flexibility-focused open system model and human development-focused human relations model should not come as a surprise.

Examining the differences in military hospitals’ effectiveness. A one-way ANOVA (Analysis of Variance) test was implemented to answer the question how the efficiency scores of military hospitals will be affected by the four different models in the CVF. As shown in Table 4, the results of ANOVA indicate that there were significant differences among the four groups (F=22.939, P<.001).

These differences in efficiency scores of the military hospitals across the four models imply that the models illustrate unique aspects of organizational effectiveness. This result reinforces the fundamental argument of the Competing Values Framework—that focusing one’s assessment of organizational effectiveness on any one single model’s efficiency scores of military hospitals by models.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>Rational Goal</th>
<th>Open System</th>
<th>Internal Process</th>
<th>Human Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>100.00</td>
<td>0.01</td>
<td>100.00</td>
<td>33.59</td>
</tr>
<tr>
<td>Unit 2</td>
<td>100.00</td>
<td>66.47</td>
<td>100.00</td>
<td>9.08</td>
</tr>
<tr>
<td>Unit 3</td>
<td>77.04</td>
<td>0.01</td>
<td>75.70</td>
<td>37.74</td>
</tr>
<tr>
<td>Unit 4</td>
<td>98.03</td>
<td>13.67</td>
<td>93.99</td>
<td>32.27</td>
</tr>
<tr>
<td>Unit 5</td>
<td>90.99</td>
<td>26.03</td>
<td>81.36</td>
<td>41.46</td>
</tr>
<tr>
<td>Unit 6</td>
<td>90.31</td>
<td>54.01</td>
<td>90.17</td>
<td>100.00</td>
</tr>
<tr>
<td>Unit 7</td>
<td>95.48</td>
<td>100.00</td>
<td>94.70</td>
<td>49.23</td>
</tr>
<tr>
<td>Unit 8</td>
<td>100.00</td>
<td>46.36</td>
<td>100.00</td>
<td>53.69</td>
</tr>
<tr>
<td>Unit 9</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Unit 10</td>
<td>93.97</td>
<td>36.70</td>
<td>67.42</td>
<td>2.18</td>
</tr>
<tr>
<td>Unit 11</td>
<td>100.00</td>
<td>85.32</td>
<td>100.00</td>
<td>9.56</td>
</tr>
<tr>
<td>Unit 12</td>
<td>100.00</td>
<td>26.76</td>
<td>100.00</td>
<td>22.60</td>
</tr>
<tr>
<td>Unit 13</td>
<td>100.00</td>
<td>24.99</td>
<td>95.33</td>
<td>76.64</td>
</tr>
<tr>
<td>Unit 14</td>
<td>91.37</td>
<td>62.04</td>
<td>73.82</td>
<td>9.19</td>
</tr>
<tr>
<td>Unit 15</td>
<td>87.90</td>
<td>3.45</td>
<td>79.74</td>
<td>35.65</td>
</tr>
<tr>
<td>Unit 16</td>
<td>73.06</td>
<td>36.81</td>
<td>61.65</td>
<td>50.14</td>
</tr>
<tr>
<td>Mean</td>
<td>93.63</td>
<td>42.66</td>
<td>88.37</td>
<td>41.44</td>
</tr>
</tbody>
</table>
point of view truly fails to catch the richness and complexity of the fully effective organization.54

Examining the relationships among military hospitals’ effectiveness by models. Another interesting question that this study can tackle is whether there is any discernable pattern in the efficiency scores among the four models. The motive for this inquiry comes from the fact that, even though the four different models focus on different aspects of organizational effectiveness in the military hospitals, the organizational effectiveness models’ ultimate goals are to enhance overall effectiveness of the military hospitals in terms of the multiplicity of military hospitals’ purposes. To answer this question, this study implemented correlation analysis among the four models. Table 5 shows the results of correlation analysis among the four models.

This correlation analysis indicates that the internal process model and rational goal model are correlated with a Pearson’s r of 0.829 and statistically significant at the p<.001 level. This counterintuitive result suggests that internal administrative work and information systems might be helpful to enhance the rational goal outcomes such as medical treatment for inpatients and outpatients, and surgeries. It is intuitively apparent that enhancing the effectiveness of administrative work process by information system finally support the effectiveness of rational goal activities.

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Table 5. Correlation Analysis Among the Four Models in the CVF

<table>
<thead>
<tr>
<th>Model</th>
<th>Rational Goal</th>
<th>Open System</th>
<th>Internal Process</th>
<th>Human Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational Goal</td>
<td>Pearson correlation</td>
<td>1</td>
<td>0.316</td>
<td>0.829*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.233</td>
<td>0.000</td>
<td>0.885</td>
</tr>
<tr>
<td>Open System</td>
<td>Pearson correlation</td>
<td>1</td>
<td>0.291</td>
<td>0.175</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.274</td>
<td>0.518</td>
<td></td>
</tr>
<tr>
<td>Human Relations</td>
<td>Pearson correlation</td>
<td>1</td>
<td>0.214</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.425</td>
<td></td>
</tr>
<tr>
<td>Internal Process</td>
<td>Pearson correlation</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Statistically significant at .001 level.

Discussion

This study started from the standpoint that each model in the Competing Values Framework (CVF) would evaluate the effectiveness of organizations differently. To find the answer, the study employed a combination of research techniques, such as Data Envelopment Analysis (DEA), ANOVA, and Correlation Analysis. According to Argyris, although the definition of effectiveness itself remains elusive, there is a need to show that an organization is effective to the extent that it accomplishes the core activities with outputs that are greater than the costs, including input costs and internal maintenance costs.55 This study is motivated by the suggestion of Lewin and Minton that organizational effectiveness research should integrate models such as CVF and techniques such as DEA.56 Therefore a technique usually conceived as a tool for measuring efficiency was used in an expanded way to measure a more integrated model of effectiveness in this study.

**Effectiveness Among Models**

Each model in the CVF has its own logic and principles regarding organizational effectiveness. Based on each of these theoretical considerations, researchers typically have evaluated organizational effectiveness from distinctive vantage points. These fundamentally different views justify organizational effectiveness of a particular organization in different ways. For instance, as this analysis illustrates, an organization that was considered effective in one model could be evaluated as ineffective in others (see Table 3).

The four different models in the CVF, the rational goal model, the open system model, the human relations model, and the internal process model, have their own theoretical rationale, but their common goal is to enhance the effectiveness of individual organizations. An organization could place emphasis on one perspective according to its own particular time and spatial continuum. If the organization relies on one particular approach to effectiveness at the expense of other approaches, this could hurt its capability to maintain effectiveness in the long run. Unfortunately, while many scholars push to view organizational effectiveness from a more integrated perspective such as the Competing Values Framework, most administrative and political forces in our contemporary public organizations focused on narrowly-drawn models that emphasize efficiency and productivity. This study offers evidence for those who argue for more wholistic approaches to public sector effectiveness including defense sector.

**Conclusion: Implications for Further Study and Practice**

This study utilized a unique approach to measure the effectiveness of military hospitals combining an integrated theoretical framework, Competing Values Framework (CVF), and a prominent measurement method, Data Envelopment Analysis (DEA). This study now summarizes important findings that are of theoretical and practical significance.

First, as we reported above, the effectiveness of 93 percent of military hospitals has been judged differently by the four competing models. According to Cameron, due to the theoretical confusion and ambiguity
of effectiveness, evaluators of effectiveness often select models and criteria arbitrarily in their assessments. This study shows that if the evaluator chooses one of the models in the CVF, s/he might reach totally different conclusions about organizational effectiveness. Thus, if one wants to get a balanced view about the effectiveness of certain organizations, this research shows what others have argued—it is ultimately necessary to combine different perspectives concurrently.

Second, in this study, organizational effectiveness of military hospitals was specifically characterized in four aspects: human relations within the organization, relationships with the environment, work process, and productivity. Furthermore, each model in the competing values framework has been shown to support those different values. This suggests that a certain organizational setting might be more prominently associated with certain organizational characteristics than others. This study provides further evidence that there is no universal effectiveness model for organization studies.

Organizational effectiveness shows the soundness of an organization’s processes and structure in terms of performance. Evaluating organizational effectiveness has a distinct practical use: It analyzes the present states of organizations to stimulate or enhance the performance of the organizations based on diagnostic findings. In addition, if one knew an organization’s position compared to the peer group in the same industry or professional area, the focal organization could define its goals in the near future much more confidently than from an evaluation based solely on self-appraisal.

Evaluation of organizational effectiveness is generally assumed to be a part of a broad set of organization management or organizational development tools. Normally, various organizational development tools start from diagnosing the state of the organization and move toward enhancing overall system management. One current popular management system, “the Balanced Scorecard (BSC),” which uses an approach similar to the CVF and applied to the performance management system in the Korean Ministry of National Defense, evolved from

57 Cameron, “Effectiveness as Paradox,” pp. 539–53.
organizational performance measurement techniques.\textsuperscript{59} This study submits that the approach used in this study, particularly when the CVF approach and DEA are combined, offers a powerful alternative management tool such as BSC.

Compared to other management tools, this approach has several advantages. First, this approach could be used within a relatively short timeframe, and often can be employed with existing data. By contrast, many management approaches require spending several years to design appropriate management tools and data. Second, this approach could be used to compare the effectiveness of many similar organizations in the same field at the same time. In comparison, most management tools lack the ability to compare a focal organization to peer groups. For example, this study deals with 16 military hospitals. Therefore, the approach in this study will make more sense to people who direct many similar organizational units under their control or management; that is, the results are useful to military commanders or high-level leaders making decisions about resource allocation. Third, this approach has comparatively solid theoretical foundations. As already shown, the four models in the competing values framework have long and rich theoretical backgrounds that parallel the broader field of organization studies. Additionally, DEA has been widely applied to various organizations in recent years.

These points show the potential of this approach, combining CVF and DEA, as a sound organizational evaluation method as well as an alternative and/or supplement to existing organization management tools. To further those advances this combination needs to be supported with subsequent studies by other scholars and practitioners who are well-acquainted with the framework and methods. In addition, this study, hopefully, is the first step for the defense arena to acquire more elaborated organizational effectiveness evaluation methods and performance management systems.