# A path analysis of diagnosis of organizational levels of functionality

## Implications to educational organizations

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## Abstract

**Purpose** – The purpose of this paper is to investigate the extent to which organizational level of functionality is affected by its leadership, its staff, the way task is performed in the organization (culture), and the structural and governance makeup of organizations. This study also determined the direct and indirect impacts of these variables on organizational functionality in general and drawing lessons to educational organizations in specific.

**Design/methodology/approach** – This is a quantitative study. Data from 185 participants were analyzed using SPSS software version 24. The data analysis procedure for this study followed various steps. First, multiple factor analysis was conducted to narrow the long list of items and to create a manageable list of construct variables for analyses. Then path analysis, using a series of multiple regression, was conducted to identify the degree of relationship between the independent and dependent variables. Finally, a path model coefficient diagram was created.

**Findings** – Using path analysis, a new model that depicts the level of interactions among the proposed variables and the extent and direction of influence of each variable on organizational level of functionality has been created. In addition, a path diagram that illustrates the model is provided and explained. This study also determined the direct and indirect impacts of these variables on organizational functionality. Finally, conclusions and implications of the study for educational organizations were presented.

**Research limitations/implications** – It should be noted that path analysis studies, by nature, are based on assumptions provided by the researchers. Hence, future studies using different variables and different assumption may not necessarily generate the same result. In addition, this study looked at a broader view of organizations rather than a specific type.

**Practical implications** – This study expanded the use of organizational diagnosis frameworks, beyond studying organizational performance, to study organizational level of functionality which can be used to diagnose the level of function (or dysfunction) of organizations in a holistic manner.

**Social implications** – The present study contributes to the body of literature in organizational diagnosis in various ways; chief of which is the creation of a new path model which shows the direct and indirect effects of specific variables in numeric terms.

**Originality/value** – Unlike previous studies on the topic, this study suggests that organizational level of functionality should be studied using variables internal to the organization, because any two organizations of similar purpose and capacity, located in similar environment, could function differently due to factors internal to the organizations. Investigating organizational level of functionality using variables internal to the organization is assumed to provide a deeper diagnosis and self-assessment as it minimizes the noises created by variables external to the organization. All the variables in this study are therefore carefully selected to be internal to organizations.

**Keywords** Organizational diagnosis, Organizational functionality, Organizational performance, Organizational study

**Paper type** Research paper

## Overview

Organizations continually make decisions about their future directions. Prudent leaders formulate their decisions through a systematic diagnosis of current and past conditions and a careful analysis of future possibilities. Various organizational theorists have suggested

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models and approaches to enable organizations and their leaders to comprehensively study their organizations by focusing on selected relevant variables. One of these approaches is organizational diagnosis which is a way of investigating current organizational status to determine if change is needed for the organization to better function (Alderfer, 1976).

A review of the literature on organizational diagnosis finds a plethora of research and numerous models proposed to diagnose organizations. One strand of research that uses diagnostic approaches is what is known as the critical success factor (CSF) that has been in the business literature since the 1960s. CSF suggests that managers need to give special attention and diagnose a few critical elements that affect the overall organizational success (Boynton and Zmud, 1984). Organizational diagnostic models that fall into this theory include McKinsey 7S Framework, Leavitt's Model and MIT 90's model.

The McKinsey 7S framework (Waterman *et al.*, 1980) suggests seven components of an organization critical for organizational effectiveness: the staff, strategy (or strategic plan), shared values, skills of the employees, the style of leadership, structure of the organization and systems. Leavitt's (1965) Model, on the other hand, provides four variables as critical elements: people, structure, task and technology and suggests that change in any of these variables affects how the entire organization functions. Similarly, the MIT 90's model (Morton, 1991) proposes internal and external factors that determine organizational performance. The internal factors for the MIT 90's model (Morton, 1991) comprise such specific variables as organizational strategy, structure, processes, people and technology, while the external factors include socio economic environment and science and technology development.

The second approach of organizational diagnosis is what is commonly referred as the open systems model (OS). This approach assumes that organizations are OS and their performance is affected not only by what is happening within the organizations but also by the interactive relationship with the environment in which it operates. While this approach focuses on three elements (inputs, throughputs and outputs), specific models that are created based on this approach focus on slightly different variables. Weisbord's (1976) Six Box Model, for example, focuses on six distinct but interrelated variables to increase understanding and improve organizational functions. These variables include Purposes, Structure, Relationships, Rewards, Helpful Mechanisms and Leadership while also taking into consideration the role of the external environment. Another organizational diagnosis model that falls under the OS approach is the Nadler–Tushman Congruence Model (Nadler and Tushman, 1977) that uses several variables categorized as inputs (environment, resource and history), transformation processes (task, individual characteristics, informal organization and formal organization) and outputs (individual behavior, group behavior and organizational/system functioning). The Congruence Model suggests that organizations are systems made up of interacting parts and the greater the level of fit, or congruence in the interaction process, the greater organizational effectiveness (Nadler and Tushman, 1980). Another model that fits into the OS approach is Tichy's (1983) Technical Political Cultural Model. Tichy's theory suggests that the technical, political and cultural components are the three strands that should work in tandem for organizations to successfully function.

A third organizational diagnosis approach utilized by researchers is the causal model of organizational diagnosis. One such causal model is one of organizational performance and change proposed by Burke and Litwin (1992). Burke and Letwin's model, significantly influenced by the OS model, is based on the literature from previous studies and their own consulting experiences. They hypothesize multi direction, causal linkages through interactions among 12 variables: mission and strategy, external environment, organizational culture, structure, management practices, leadership, systems, climate, skills-job match, motivation, individual needs and values, and performance. Their model, however, is based on their understanding without utilizing any qualitative or quantitative

data analysis to call it a purely empirical causal model. A recent causal model introduced by Gavrea *et al.* (2011), tested linear relationships among multiple variables grouped into practices and performances variables. Gavrea *et al.*'s model did not extend to a comprehensive model beyond looking for relationships and direct effects. In sum, causal models of organizational diagnosis assume that there is a cause and effect relationship between selected variables that positively or negatively impact organizational goal achievement.

While most of the variables these prior studies used are relevant, a number of organizational diagnosis models appear to be either unnecessarily complex or prescriptive in nature. Moreover, almost all widely used models were developed between the 1960s and 1990s of which the most recent one (the Burke–Litwin Causal Model) was developed in 1992, thereby calling for a fresh study.

The purpose of this research, is therefore, to create a new diagnostic model for investigating the extent to which organizational level of functionality is affected by its leadership, its staff, the way task is performed in the organization (culture), and the structural and governance makeup of organizations. Using path analysis, which is a type of structural equation modeling, a new model that depicts the level of interactions among the proposed variables and the extent and direction of the influence of each variable on organizational level of functionality will be identified. In the end, a path diagram that illustrates the model will be provided and explained. This study also aims to determine the direct and indirect impacts of these variables on organizational functionality and will consider its implications for an educational environment.

The selection of these variables for the model is based on three assumptions. The first assumption is that any given organization is made up of these variables (leaders, staff, culture and organizational structure), hence, studies about organizational level of functionality should address all. These variables have been carefully selected based on the literature on the subject and have been widely used as integral components of the major organizational diagnosis models we have today. The Leadership and/or Staff variables are directly, or indirectly, incorporated in such organizational diagnosis models as Leavitt's (1965) Model, Likert (1967) System Analysis, Weisbord's (1976) Six Box Model, McKinsey's 7s Framework (Waterman *et al.*, 1980), Tichy's (1983) Technical Political Cultural Model, The Burk–Litwin Model (Burke and Litwin, 1992) and Nelson and Burns' (1984) High-Performance Programming Framework.

In addition, almost all definitions of leadership we have today relate leadership to organizational goal achievement. The literature of leadership, though, varies in approaches and focus, but is in agreement that leadership is an important variable to study organizational level of functionality. Various studies in the subject directly or indirectly underline the importance of relationships between leadership and organizational performance (Vigoda-Gadot, 2007; Wang, 2005; Obiwuru *et al.*, 2011; Ferris and Rowland,1981 ; MacKenzie *et al.*, 2001).

Similarly, the role employees/staff play in organizational goal achievement has been a focus of many previous studies. Gberevbie (2008), Okoh (1998), Bamigboye and Aderibigbe (2004) and Jike (2003) highlighted the importance of employee treatment and active participation for organizational goal achievement. Amah and Ahiauzu (2013) hypothesized on the role of employees on organizational level of functionality and found positive correlation between employee productivity and organizational effectiveness.

Organizational diagnosis models that incorporated Culture as their variable include Weisbord's (1976) Six Box Model, McKinsey's 7s Framework (Waterman *et al.*, 1980) and Tichy's (1983) Technical Political Cultural Model. A widely used and easy to understand definition of culture is "the way we do things around here" as initially used by Deal and Kennedy (1982). Organizational culture is a frequently used variable of

organizational studies. Though slightly different in their approaches and models, authors such as Schein (1990), Martin (1992), Deal and Kennedy (1982), Kotter and Heskett (1992) and Peters and Waterman (1982) contend that organizational level of performance is directly or indirectly influenced by organizational culture. Lee and Yu (2004) specifically found culture to have impact not only on the performance of an organization but also the organizational processes in place.

And, finally, diagnostic models that utilized the organizational Structure variable include Leavitt's (1965) Model, Weisbord's (1976) Six Box Model, McKinsey's 7s Framework (Waterman *et al.*, 1980), Tichy's (1983) Technical Political Cultural Model, The Burk–Litwin Model (Burke and Litwin, 1992) and the Congruence Model (Nadler and Tushman, 1980). It is difficult to conceptualize organizations absent structure; however, understanding its impact on organizational level of functionality depends on how it is understood in the first place. According to Meijaard *et al.* (2005), structure is viewed in terms of division of labor and coordination mechanisms within an organization. A more comprehensive definition of organizational structure is provided by Burke and Litwin (1992, p. 283) as "the arrangement of functions and people into specific areas and levels of responsibility, decision making authority, communication, and relationships to assure effective implementation of the organization's mission and strategy." Organizational structure in relation to performance has been an area that commanded the interest of some researchers. A study by Leitão and Franco (2008) found that an organization's structure affects its performance both in terms of immediate economic terms and non-economic aspects. Hao *et al.* (2012) found an indirect relationship between performance and structure through innovation (for higher-level managers) and through organizational learning (for middle-level managers). Čater and Pučko (2010) and Burke and Litwin (1992) similarly amplify the role organizational structure plays in organizational effectiveness. While the various models and the literature on the subject provide due attention to Leadership, Staff, Culture and Structure as important variables of organizational diagnosis study, none of these studies focus on creating a path model of analyses.

The second assumption is that organizational level of functionality should be studied using variables internal to the organization, because any two organizations of similar purpose and capacity, located in similar environment, could function differently due to factors internal to the organizations. Investigating organizational level of functionality using variables internal to the organization is assumed to provide a deeper diagnosis and self-assessment as it minimizes the noises created by variables external to the organization. All the variables in this study are therefore carefully selected to be internal to organizations.

The third assumption is that various degrees of relationship exist among leadership, staff, organizational culture and the overall governance structure of an organization and organizational level of functionality. While determining the level of relationship and the direction of impact is part of this study, almost all the aforementioned models suggested the existence of the relationship.

### Research methodology
*Data collection*
The data collection instrument used for this study was a 60-item questionnaire developed by the researchers. The instrument was divided into two parts. Part 1 included five items related to the background of participants and Part 2 contained 55 items related to organizational level of functionality where participants were asked to rate leadership, staff, organizational practices, and the overall governance and structure. The questionnaire was administered online via SurveyMonkey software and a total of 185 participants completed the survey.

*Study participants*
Participants of the study were recruited through snowball sampling. Snowball sampling is appropriate when the nature of a study is sensitive and when there is a need to protect the identities of participants (Vogt and Johnson, 2011). The researcher believes that this research is sensitive because it asks participants to rate either their current organization or an organization they know well enough to assess its level of functionality using a Likert scale ranging from "extremely dysfunctional" to "very well-functioning." Snowball sampling enabled the researcher to minimize such risk by recruiting a few individuals from various organizations who in return recruited others across the USA, thereby, creating a snowball sample. The background information of the participants provided enough detail to filter the responses. Accordingly, out of the 185 (100 percent) who completed the survey, 52.4 percent were female, 43.2 percent were male and 4.3 percent did not identify their gender. The participants' level of education ranged from terminal degree to high school. In total, 28 percent held doctoral/terminal degrees, 41.6 percent had master's degrees, 20.5 percent completed undergraduate degree, approximately 5 percent had associate degree or had completed some college course work and 4.9 percent completed or dropped out of high school. Participants also varied by years of work experience. Those who worked for over 21 years accounted for 44.9 percent of all participants, 34.6 percent of participants had job experiences ranging from 11 to 20 years, 14.1 percent worked between 6 and 10 years, and the rest 6.4 percent have 5 years or less work experience.

**Data analysis**
Data were analyzed using SPSS software version 24. The data analysis procedure for this study followed various steps. First, multiple factor analysis was conducted to narrow the long list of items and to create a manageable list of construct variables for analyses. Then the original 55 items under four subheadings (Leadership, Employee, Organization and Governance/Structure) were tested for factorability using Kaiser–Meyer–Olkin (KMO measure of sample adequacy) and for the reliability of factors using Cronbach's $\alpha$. Once the data were organized for analyses several multiple regressions were conducted. The results of each analysis are presented below.

According to Table I, the four constructs were found to have a KMO levels ranging from 0.91 to 0.96. Constructs with $> 0.5$ KMO level are usually accepted to be factorable.

Once the factorability was assured, factor analyses using principal component analyses were conducted for each of the four sub components resulting in six constructs: Leadership, Employee, Culture of Professionalism, Culture of Care, Governance Policy and Structure. For each construct, the minimum coefficient for inclusion was 0.63 which is conservative given the rule of thumb of the following cut points according to Comrey and Lee (1992): excellent $> 0.7$, very good $> 0.63$, good $> 0.55$ and fair $> 0.45$.

As shown in Table II, all constructs had $\alpha$ levels $> 0.80$, which show the items under each construct to have a very high level of internal consistency.

Path analysis was used to identify the degree of relationship between the independent variables (IVs) and dependent variables (DVs). Path analysis shows the direction, relationship

| Items | KMO |
| --- | --- |
| Leadership items | 0.96* |
| Staff/Employee items | 0.91* |
| Organizational Culture items | 0.94* |
| Governance Structure items | 0.93* |
| **Note:** *$p < 0.05$ | |

and the extent of effects of variables in a model. One way of conducting path analysis is through a series of multiple regression analyses. Multiple regression coefficients are equivalent to path coefficients where the standardized $\beta$ score tells the magnitude of the effects of IV/s on the DV.

For the first multiple regression, the six constructs (Leadership, Staff, Culture of Professionalism, Culture of Care, Governance Policy and Structure) were the IVs. The DV, for this initial regression was Organizational Level of Functionality, Item No. 6 of the survey instrument, where participants rated their respective organization in a scale of 1–9 where 1 is "extremely dysfunctional" and 9 is "very well-functioning." A stepwise multiple regression analysis filtered out four out of the six IVs and provided a model where Leadership and Staff have direct and significant impact on the DV, Organizational Level of Functionality. To determine the indirect impacts of the remaining four IVs (Culture of Professionalism, Structure, Culture of Care and Policy) on Organizational Level of Functionality, a series of multiple regressions were run. Table III summarizes the DVs and IVs of each regression analysis with the corresponding $R^2$, standardized $\beta$ and collinearity statistics.

According to the first regression in Table III, 69 percent of the variation in Organizational Level of Functionality (F) can be explained by the relationship to Leadership (L) and Staff/Employee (E). In the second regression, Culture of Professionalism (CP), Culture of Care (CC), and Structure (S) accounted for 75 percent of variation in Leadership effectiveness. In the third regression, 83 percent of the variability in Employee/Staff (E) effectiveness can be explained by the Culture of Professionalism (CP) and Culture of Care (CC) in the organization. Organizational Policy was found to have no meaningful relationship to contribute to any of the regressions, hence it was excluded from the model. Table III also shows the variance inflation factor (VIF) of each IV which is a test of multicollinearity. Extreme level of multicollinearity threatens the soundness of regression analysis. According to Anderson *et al.* (1996), a VIF level under 10 is considered acceptable. All the IVs were within the stated limit ($< 10$ of VIF) ensuring that all the IVs in the models were found to be free of multicollinearity issues.

| Construct | $\alpha$ |
|---|---|
| Leadership | 0.97 |
| Employee | 0.93 |
| Culture of Professionalism | 0.96 |
| Culture of Care | 0.82 |
| Governance Policy | 0.94 |
| Structure | 0.91 |

**Table II.**
Reliability analysis

| Multiple regression | Dependent variable | Independent variables | $\beta$ | $R^2$ | Sig. | VIF |
|---|---|---|---|---|---|---|
| 1 | Organizational Functionality (F) | (1) Leadership (L) | 0.403 | 0.69 | $< 0.001$ | 2.2 |
| | | (2) Staff/Employee (E) | 0.486 | | | 2.2 |
| 2 | Leadership (L) | (1) Culture of Professionalism (CP) | 0.665 | 0.75 | $< 0.001$ | 1.6 |
| | | (2) Culture of Care (CC) | 0.281 | | | 1.5 |
| | | (3) Structure (S) | 0.160 | | | 2.3 |
| 3 | Staff/Employee (E) | (1) Culture of Professionalism (CP) | 0.748 | 0.83 | $< 0.001$ | 1.0 |
| | | (2) Culture of Care (CC) | 0.445 | | | 1.0 |

**Table III.**
Regression model summary with standardized $\beta$ and multicollinearity statistics

The direct and indirect effects of the IVs on each DV are presented in Figure 1 through path model coefficient diagram and path decomposition. Figure 1 shows the Organization Level of Functionality model identified as a result of this research and Figure 2 explains the path decomposition computation process.

Table IV presents the direct and indirect impacts of each IV on Organization Level of Functionality (F). Accordingly, Leadership (L) and Employee (E) are the two variables to have direct impact on Organizational level of Functionality (F) at $\beta$ levels of 0.403 and 0.486, respectively. Culture of Care (CC) and Culture of Professionalism (CP) have indirect impacts on Organizational Level of Functionality through Leadership and Staff at combined $\beta$ levels of 0.329 and 0.634, respectively. Structure (S) also has indirect impact through Leadership at a $\beta$ level of 0.064.
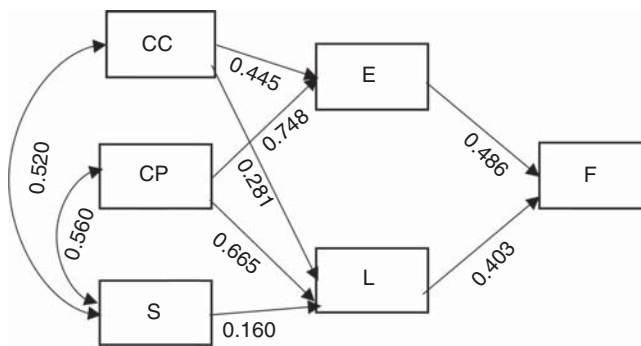


**Figure 1.**
Path model
coefficient diagram

Direct

$$L \longrightarrow F = \beta_{LF} = 0.403$$

$$E \longrightarrow F = \beta_{EF} = 0.486$$

Indirect

$$CC \longrightarrow F = (\beta_{CCE} \times \beta_{EF}) + (\beta_{CCL} \times \beta_{LF}) = (0.445 \times 0.486) + (0.281 \times 0.403) = 0.329$$

$$CP \longrightarrow F = (\beta_{CPE} \times \beta_{EF}) + (\beta_{CPL} \times \beta_{LF}) = (0.748 \times 0.486) + (0.665 \times 0.403) = 0.631$$

$$S \longrightarrow F = (\beta_{SL} \times \beta_{LF}) = (0.160 \times 0.403) = 0.064$$

**Figure 2.**
Path decomposition

| Constructs | Direct | Effects Indirect | Total |
|---|---|---|---|
| Employee (E) | 0.486 | | 0.486 |
| Leadership (L) | 0.403 | | 0.403 |
| Culture of Professionalism (CP) | | 0.631 | 0.631 |
| Culture of Care (CC) | | 0.329 | 0.329 |
| Structure (S) | | 0.064 | 0.064 |

**Table IV.**
Path model effect
coefficients on
organizational level of
functionality

## Conclusions and implications to educational organizations

The results of the data analysis show that of the original six constructs of internal organizational components generated through factor analysis (Leadership, Employee, Culture of Professionalism, Culture of Care, Structure and Policy), five were found to have significant effects on organizational level of functionality and were used to create the new model of Organizational Level of Functionality. The degree of effect each variable has on organizational level of functionality varied.

The first finding was that Leadership and Employee variables were found to have significant direct effects on organizational level of functionality. This finding agrees with several educational research studies that focus on employees and leaders. Focusing on employees' impact, Senge (1990) and Fullan (2008) underlined the positive contributions of a learning community of employees for organizational success and performance. In a similar note, Bass and Avolio (1994) maintain a differentiated response to individuals in the organization based upon their needs (collective work) to promote a sense of self-efficacy and ultimately impact organizational functionality. In other words, a sense of esprit de corps among employees (faculty and staff) contributes to the larger mission of the organization. In schools, the culture of continual learning is often represented by the terms, "communities of practice," or "Professional Learning Communities." Both terms seek to describe interactions among faculty that promote learning through inquiry with the goal of positively influencing student outcomes, which is the widely accepted measure of effectiveness in educational organizations. In addition, the positive impact of leaders for organizational performance in this study agrees with the findings of prior studies on educational leaders. Waters and Marzano (2006) found statistically significant positive relationship between school leadership (principal and superintendents) and student achievement. Similarly, Wahlstrom et al. (2010) argue that they "have not found a single case of a school improving its student achievement record in the absence of talented leadership" (p. 9). Wahlstrom et al. added that the impact of school leadership on student learning to be the second most important factor next to classroom instruction. The result of our study found a similar result in that leadership to be the second most important factor for organizational performance next to employees with direct coefficient levels of 0.403 and 0.486, respectively.

In this study, we found that Culture of Professionalism and Culture of Care directly affect Leadership and Employees, contributing indirectly to the model. Similarly, Organizational Structure was found to have an indirect effect on organizational level of functionality through Leadership. Extant research on the effects of educational cultures of professionalism and care also agrees with the findings of this study (Drago-Severson, 2012; Barth, 2001; Fullan, 2008; DuFour and Marzano, 2011). Numerous researchers have inferred that the leader's impact is enhanced in professional and caring environments where faculty feel trust in their leader (Lawson et al., 2017; Bryk and Schneider, 2002; Forsyth, 2011), believe in and agree with their vision and mission (Marzano et al., 2005), and regard their leader as a worthy role model (Cotton, 2003; Burns, 1978). Similarly, the structure of an organization serves to create the pathways by which work is accomplished. Effective schools have predetermined protocols and procedures that ensure efficient execution of roles and responsibilities (Curtis and City, 2009; Johnson et al., 2015; DuFour and Fullan, 2013; Marzano et al., 2005). Absent consistently reliable methods for doing the work of schools, inefficiency, confusion and balkanization can render efforts by the leader and employees ineffective. While there has been a focus on the principal as instructional leader, this does not negate the importance of the management of the structure and underlying processes of an organization without which goals could not be realized efficiently.

In sum the predominant OD models that we have today do not utilize path analysis or do not indicate the level of direct and indirect contributions of each variable

to their models. Some of these models show interactions among variables but do not clearly indicate the level of the interactions. For example, Burke and Litwin's (1992) Causal Model, Nadler–Tushman's Congruence Model (Nadler and Tushman, 1980), Leavitt's (1965) Model and Weisbord's (1976) Six Box Model, all showed bidirectional arrows among variables without indicating the level of the effects in numerical terms, as their models were not purely quantitative by design. The present study contributes to the body of literature in organizational diagnosis in various ways; chief of which is the creation of a new path model which shows the direct and indirect effects of specific variables in numeric terms. The other contribution is that it expanded the use of organizational diagnosis frameworks, beyond studying organizational performance, to study organizational level of functionality which can be used to diagnose the level of function (or dysfunction) of organizations in a holistic manner.

It should be noted that path analysis studies, by nature, are based on assumptions provided by the researchers. The assumptions in this study were: that organizations comprise four essential components: Leadership, Staff, Organizational ways of doing things (later categorized into Culture of Professionalism and Culture of Care), and Governance Structure; to diagnose Organizational Level of Functionality the mentioned internal organizational components should be factored in the model, excluding external environment factors used by traditional OD studies; and the study assumes causal relationship among Leadership effectiveness, Staff effectiveness, Culture of Professionalism, Culture of Care, Organizational Structure and organizational Level of Functionality.

Finally, future studies using different variables and different assumption may not necessarily generate the same result. This model can be used as a spring board for further studies and improved through building on the assumptions and variables included in this model.

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