

# PROPOSING AN ORGANIZATIONAL DIAGNOSTIC MODEL BASED ON FINANCIAL CUM PRODUCTIVITY HORIZONTAL ANALYSIS

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## Abstract

*The aims of this study are to demonstrate and test a growth-based organizational diagnostic model, which is easy to understand and implement. In order to do so, first a conceptual framework of the model is built while establishing rationale of different components of the model, and finally the application of the model on 51 sampled KSE-100 companies, from 18 different broadly categorized industrial sectors selected on the basis of purposive sampling, is demonstrated on case to case basis. In order to check if the data fits the model, Structural Equation Modeling (SEM) is used. The result shows a perfect data to model fit and usefulness of the model to carry-out instant organizational diagnosis.*

**Keywords:** Organizational Diagnosis, Conceptual Framework, Productivity Analysis, Stake Holder.

**JEL Classification:** G200

## Introduction

### *Background of the Study*

The aims of this study, as envisaged by earlier practitioners<sup>1</sup> of the proposed model (Tsuchiya, 1997), are first to demonstrate a simple to implement organizational diagnostic model based on financial cum productivity analysis, which can be used to diagnose a business concern instantly at any point in time in order to identify opportunities for incremental or overall organizational improvement and secondly to test the fitness of the model on real time data. Notable management experts (Fukuda & Sase, 1994; Shimizu, Wainai & Nagai, 1992) have recommended that a hybrid of financial and productivity analysis can either be used as a standalone tool or can be synched, as a permanent feature, with an integrated management system designed for bringing continuous ongoing improvement in the

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organization. The proposed model uses a combination of similar financial and productivity related horizontal analysis for developing critical insights into an organization's performance. The model is used by management consultants in the Far East but It has to yet to be presented and discussed in academic circles.

Before demonstrating the model, it is imperative to discuss one by one different components of the model and their relationship with each other. It is also necessary to establish the rationale of the model so that adopters develop a clear understanding of the conceptual frameworks and underlying principles. Discussion on each important aspect is given below in an orderly manner.

The company's top-line i.e., sales or revenue, figure is the single most important indicator of business performance (Weinzimmer, Nystrom, & Freeman, 1998). Sales figure is clearly the tipping point for review. Equally important is the company's bottom-line i.e., net profit, as it is derived from the top-line. It is a matter of concern if the growth in top-line could not be translated into desirable growth in the bottom-line over a specified period. A continuous growth in sales, successfully realized into streams of net profits, is the most desirable state for any business concern (Tsuchiya, 1997). After making sure the desired results are achieved, it becomes important to gauge if the organizational resources committed for realization of the desired results were optimally utilized or not. Under-utilization of resources is also a matter of concern. In this regard, revenue or net profit per employee becomes another important measure. Though they are the most significant, employees are only a single type of the different resources employed to achieve top-line or bottom-line targets. It becomes imperative, therefore, to measure the return on a unit of overall capital employed i.e., all things in monetary terms, the language the management understand (Shimizu, Wainai, & Nagai, 1992).

While sales and net profits are general indicators of the wealth of the organization accumulated over a period of time, the stakeholders are more concerned about their share in the business gains. For instance, the investors are interested in the dividends and stock price appreciation, the creditors in recovery of the principal and on top of that accumulation of profits to support payment of interest, the Government in taxes and the employees in bonuses etc. Therefore, measurement of wealth for gains-sharing becomes necessary (Tsuchiya, 1997). Calculation of the wealth i.e., value added or wealth created and distributed among the stakeholders is therefore very essential (Fukuda & Sase, 1994).

Growth as a measure is a relative phenomenon as the size of the organization matters. For a large organization, little growth might be significant whereas for small organizations big growth might not be significant. It is therefore important to incorporate the size of the organization in to the equation in order to use the growth model otherwise the results would be misleading. There are different approaches used all over the world to measure the size of the organization. Broadly the organizations are categorized as small, medium and large. The size of the organization can be measured based on different factors such as the number of employees, capital employed and the magnitude of revenues (Weinzimmer, 2000).

A business concern can grow in terms of number of employees; salaries (payroll) and capital. However, the percentage of growth in the number of employees, payroll and capital individually should be less than the revenue the business enterprise earns over a specified period of time otherwise the growth is not sustainable. Percentage growth in corporate revenues should be less than the percentage growth in terms of profit and value-added. If this relationship does not exist there seems to be something wrong with the growth pattern. To be specified, if the following relationship does not exist then there is or are problems in the organizational growth potential (Tsuchiya, 1997).

Table 1

| % Increase in: |   | % Increase in: |   | % Increase in:  |
|----------------|---|----------------|---|-----------------|
| (1) Employee   | < |                | < | (5) Profit      |
| (2) Payroll    | < | (4) Sale       |   |                 |
| (3) Capital    | < |                | < | (6) Value-added |

Here 'Employee' means total number of employees or the strength of the organization, 'Payroll' refers to the remuneration paid to the employees, 'Capital' means total assets, 'Sales' means revenues i.e., the top-line, 'Profit' means net profit and value-added refers to sales less cost of services / goods purchased from outside i.e., revenue less value created by other players in the value chain (Tsuchiya, 1997).

### *Significance of the Study*

As evident from the literature review, apart from DuPont; Integrated Productivity Improvement; and Value-added Productivity Measurement analyses there has been marginal progress made in the field of organizational diagnostics using hybrid mechanism based on financial and productivity analysis. Although, the proposed model is used by many practitioners effectively, the question is why it has not been publicized so that a wider range of people can benefit from its use. This shows a gap between practice and academia. It is therefore, important to establish the efficacy of the model, from academic point of view, in pinpointing organizational problem areas in order to address them. Therefore, the key question to be addressed in this study is, can the proposed model be used successfully to identify the true state of financial situation of the organization? This needs to be substantiated on real time data. This study focuses to accomplish this end on the basis of analysis on real-time data from Pakistani market. An investor needs to ascertain if it is viable to invest in the stocks of the company, a creditor needs to make sure the lent funds could be successfully recovered, a consultant wants to identify the problem areas in the organization and an analyst wants to diagnose the organization to facilitate decisions. This model provides for a mechanism to carry out diagnosis of the firm in a structured and meaningful manner, instantly, to make informed decisions.

### *Study Objectives*

The objective of the study is to demonstrate and test an organizational diagnostic model based on financial cum productivity horizontal analysis that can be used to assess the health of the organization and to initiate the academic discourse on the subject theme. The study would also present an overview of the widely regarded organizational diagnostic models introduced in the past.

### *Hypothesis*

*H1 : The model is useful for carrying diagnosis of the organization.*

*Ho: The model is not useful for carrying diagnosis of the organization.*

## **Literature Review**

### *General*

Organizations are living organisms, as they consist of people, and therefore organizations have to continuously look for new ways to cope with the changing environmental settings. One of the strategies to adopt change is organizational diagnosis to assess the state of the organization in order to bridge the gaps through interventions for future development (Kume & Leskaj, 2015).

Like a patient, organizational diagnosis involves finding symptoms detrimental to organizational health in order to incorporate improvements in a systematic manner (Saeed & Wang, 2013). Although different methods for organizational diagnosis have been developed and proposed over the recent few years, only the test of time would prove their worth and efficacy (Zarei, Chaghosee, & Ghapanchi, 2014).

As highlighted by Porras & Robertson (1986), and as per our review of relevant literature, it is evident that the earlier models focus on the following broad dimensions:

1. Inputs: Man (Motivation, Leadership), Methods (Tasks), Materials & Machines.
2. Processes: Process Management, Policies & Procedures etc.
3. Outputs: Financial & Productivity indicators.
4. Internal Environment: Systems & Structures.
5. External Environment: Market, Political & Technological aspects.
6. Purpose: Raison De'tre, Strategy, Objectives, Mission & Vision.

The Following conceptual framework can be used to summarize the focal areas of earlier models which seems pretty logical from the standpoint of overview:

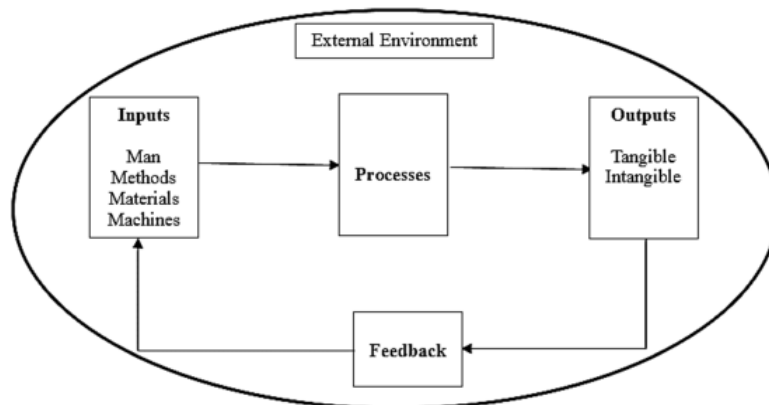


Figure 1: Components Focused in Diagnostic Models & Systems Framework

Areas for organizational interventions in the earlier models as also summarized by Saeed and Wang (2013), and as per our literature review, are:

1. Capacity building.
2. Behavior.
3. Processes.
4. Structures.
5. Technologies.
6. Goals.
7. Allocation of Resources.
8. Cultures.

As noted by Hayes (2007), and in line with our study, the process for carrying-out organizational diagnosis in the context of organizational change involves the following steps:

1. Developing a framework and mechanism for diagnosis.

2. Planning a fact finding or data collection methodology.
3. Carrying analysis of facts and figures.
4. Deriving conclusions.
5. Identifying desired interventions.

Only the organizational diagnostic models which are widely used have been discussed in this study. These widely used organizational diagnostic models have been discussed in literature in detail (Saeed & Wang, 2013; Gavrea, 2010; Falletta, 2005). However, it is interesting to note that there is no consensus over which model to include or exclude from the study among the researchers.

Among the earlier diagnostic methods is the DuPont Analysis which is useful for planning and control. DuPont analysis is a widely applied management accounting quantitative analysis (DuPont Corporation, 1920s). The significant feature of DuPont Analysis is the combination of profitability and productivity ratio analysis.

While DuPont analysis was used to identify areas for improvement, the analysis itself does not suggest any remedial measure leaving to the discretion of the management to opt for an appropriate intervention strategy. DuPont model has similarities with the proposed organizational diagnostic model as it employs both profitability and productivity measurement indicators, however, the difference is that DuPont model is not a growth-centered model; rather it employs ratio analysis between inputs and outputs with creative placement of outputs in numerator while adhering to mathematical principles.

Force Field Analysis introduced by Lewin (1951) provides for a mechanism for organizational transition from an undesirable state to a desirable state. A framework for organizational change was derived from the Force Field Analysis approach. Based on four factors i.e., people, tasks, structure, and technology, the Diamond Model was developed by Leavitt (1965) for measuring organizational effectiveness and bringing improvements accordingly.

At the same time, the Open Systems Theory emerged which focuses on organization's interaction with and dependence on the organization's external environment (Emery & Trist, 1965). Open Systems Theory provided a mechanism for assessing organizational interaction with the external environment.

System Analysis based on four management styles i.e., participative, consultative, benevolent-authoritative and exploitative-authoritative was developed by Likert (1967) which provides a framework for assessing management styles.

For assessing the functioning of the organization, Six-box Model based on six factors i.e., purpose, structure, relationships, rewards, leadership and helpful mechanisms was introduced by Weisbord (1976). The Six-box Model provides for a method to assess the nature of organizational interaction with the environment. Weisbord's model is considered to be widely used model due to its lucidity (Jones & Brazzel, 2012). Congruence Model for Organization Analysis, consistent with the Open Systems Theory and based on analysis of organizational behavior at individual, group and systems levels was introduced by Nadler and Tushman (1977).

Value-based 7S management framework was developed by Waterman and Peters (1981). The 7S refer to the seven key dimensions in the context of organizational framework i.e. style, staff, systems, strategy, structure, skills and shared values which are focused to assess organizations.

TPC Framework, consistent with Open Systems Theory, was introduced by Tichy (1983) TPC stands for Technical, Political & Cultural aspects of the organization. TPC Framework provides for an approach to organizational strategic management based on the change levers namely mission strategy, tasks, prescribed networks, people, organizational processes, and emergent networks.

High Performance Programming was developed by Nelson and Burns (1984). High Performance Programming is used to categorize organizations as reactive (level-1), responsive (level-2), proactive (level-3) and performing (level-4). Desired interventions are incorporated after getting feedback through a survey-questionnaire under the High Performance Programming approach. High Performance Programming provides a framework for assessing the nature of the organization.

Organizational model to diagnose behavior at individual and group levels was introduced by Harrison (1987). The model focuses on outputs i.e., performance and Quality of Work Life. Another significant development took place with the introduction of Value-added Productivity Measurement approach introduced by Shimizu, Wainai and Nagai (1991). The framework advocates the use of integrated management systems for quantitative value-added productivity measurement and analysis for organizational incremental improvement based on popular Japanese management systems including Kaizen and Total Quality Management.

Model of Organizational Performance and Change was developed by Burke and Litwin (1992). The Model of Organizational Performance and Change is based on different organizational factors. The striking feature of the Model is that it derives a great deal from previous organizational development models that are considered as precursors for organizational change.

While providing guidelines to productivity facilitators, Fukuda and Sase (1994) introduced Integrated Productivity and Quality Improvement framework with a strategic organizational focus applying top-down and bottom-up approaches based on qualitative analysis supported with quantitative analysis. There is a need to apply a hybrid of qualitative and quantitative analysis to

diagnose organizations in the 21<sup>st</sup> century (Vitale, Armenakis, & Field, 2008). It is interesting to note that Baba (1996) and Imai (1997) highlighted an approach through which the model for rational decision making proposed by Simon (1955) was merged in order to solve problems and implement improvements. The impact on organization envisaged was incremental but it can be dramatic depending on the maturity of the organization and level at which intervention is made. Here is the extracted hybrid conceptual mechanism in crux:

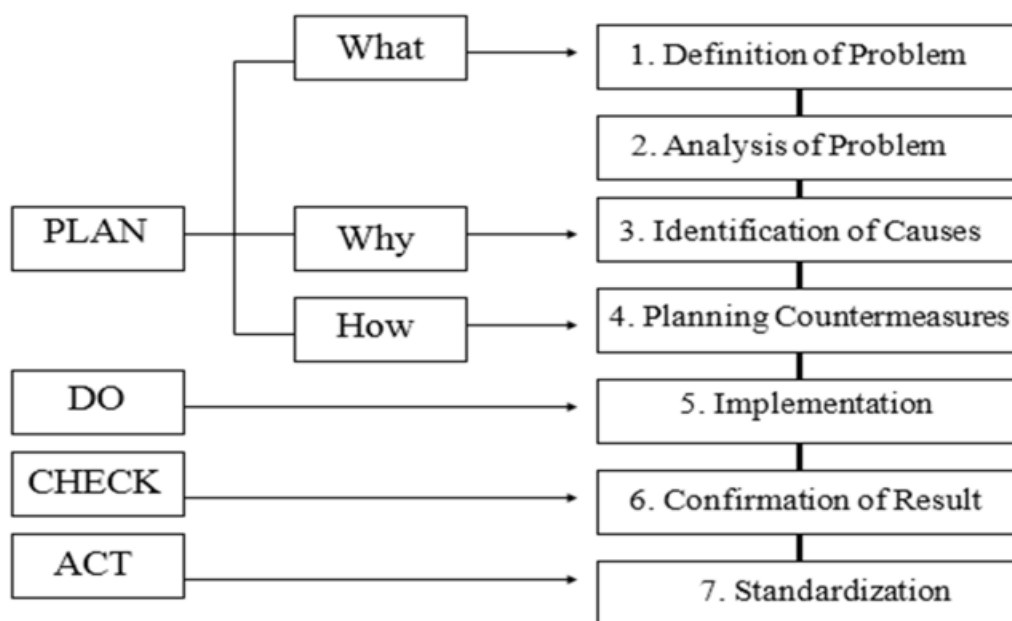


Figure 2: PDCA & Problem-Solving Cycles

Action Learning for Organization Development and Change approach based on Action Learning Theory as the name suggests was introduced by Freedman (2000). The Action Learning for Organization Development and Change methodology is used by the problem-solving teams while identifying and solving problems.



A summary of all organizational diagnostic models can be presented in the following manner:

| Model                                         | Quantitative Analysis | Qualitative Analysis | Incremental Change | Drastic Change | Set Focus Areas |
|-----------------------------------------------|-----------------------|----------------------|--------------------|----------------|-----------------|
| DuPont Analysis                               | X                     |                      | X                  |                | X               |
| Force Field Analysis                          |                       | X                    |                    | X              |                 |
| Open Systems                                  |                       | X                    |                    | X              | X               |
| Likert's Systems Analysis                     |                       | X                    |                    | X              | X               |
| Six-box                                       |                       | X                    |                    | X              | X               |
| Congruence                                    |                       | X                    |                    | X              | X               |
| 7-S                                           |                       | X                    |                    | X              | X               |
| Jichy's TPC                                   |                       | X                    |                    | X              | X               |
| High Performance Programming                  |                       | X                    |                    | X              | X               |
| Harrison's Output-based                       |                       | X                    |                    | X              | X               |
| Value-added Productivity Measurement          | X                     |                      | X                  |                |                 |
| Organizational Performance & Change           |                       | X                    |                    | X              | X               |
| Integrated Productivity & Quality Improvement | X                     |                      | X                  |                |                 |
| Action Learning                               |                       | X                    | X                  |                |                 |
| PDCA Cycle                                    |                       | X                    | X                  |                |                 |

Figure 3: Summarized Diagnostic Model Dimensions & Characteristics

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### Research Methodology

#### *Sampling Method*

Secondary data presented in the annual published reports of KSE-100 companies was required to be gathered to demonstrate the model. Since the published data is audited by reputable firms, it is considered reliable. There are 51 KSE-100 companies that disclose the data in their annual audited financial reports required for analysis based on the proposed model.

#### *Sampling Technique*

Judgmental or purposive sampling technique is used i.e., financial data disclosed by top KSE-100 listed companies from major sectors of the economy is used, as it is a cross-sectional study.

#### *Data Analysis Techniques*

LISREL Version 9.2 (Student Edition) was used for Structural Equation Modeling in order to test the entire model in one go. No other econometric technique provides a way to test the entire model.

### Results and Discussion

#### *Tested Hypothesis*

The usefulness of the proposed organizational diagnostic model can best be substantiated with the fact that out of the 51 sampled KSE-100 companies, only 02 companies have been found to be complying completely with the desired requirements of the model i.e., growth in number of employees, payroll and capital is less than growth in sales and the growth in profit and value-added is greater than growth in sales. Out of 51 cases, there are 23 instances where growth in profit and value added is greater than growth in sales. On the other hand, there are only 6 instances where growth in number of employees, payroll and capital is less than the growth in sales. There have been 28, 35, 40, 19 and 13 instances where the results are in compliance with ideal situations assumed in the model in terms of profit, value-added, number of employees, payroll and capital respectively.

While looking at the case by case diagnosis of the 51 sampled KSE-100 companies from different industrial sectors of the economy of Pakistan, we see that the model gives valuable insights on the areas of key concern, apart from the two companies i.e., Engro Fertilizer and Orix Leasing that have shown satisfactory results, problem areas in the rest of the companies have been clearly identified.

### SEM Test Results

The chi-square statistic is insignificant, indicating an adequate model fit to the sample correlation matrix (Minimum Fit Function Chi-Square = 0.08,  $df = 1$ ,  $p = 0.77551$ ). Several of the other model-fit indices for the theoretical model indicate an almost perfect data to model fit, for example, GFI = .999 (ideally  $\geq 90$ ), RMSEA = 0.000, and NFI = 0.999 (ideally  $\geq 90$ ). The path diagram is as under:

Modification indices in the computer output, however, offer suggestions on how to further improve the model to data-fit. Complete indices are given below:

Table 2  
*Modification indices*

| Model Fit Criterion                             | Calculation             | Accepted Value | Adequacy |
|-------------------------------------------------|-------------------------|----------------|----------|
| Maximum Likelihood Ratio Chi-Square (C1)        | 0.0813 ( $P = 0.7755$ ) |                |          |
| Browne's (1984) ADF Chi-Square (C2_NT)          | 0.0813 ( $P = 0.7756$ ) |                |          |
| Root Mean Square Error of Approximation (RMSEA) | 0.000                   | < 0.08         | Good     |
| Normed Fit Index (NFI)                          | 0.999                   | $\geq 0.90$    | Good     |
| Non-Normed Fit Index (NNFI)                     | 1.12                    | $\geq 0.90$    | Good     |
| Parsimony Normed Fit Index (PNFI)               | 0.0666                  | $\geq 0.90$    | Very Low |
| Comparative Fit Index (CFI)                     | 1.000                   | $\geq 0.90$    | Good     |
| Incremental Fit Index (IFI)                     | 1.007                   | $\geq 0.90$    | Good     |
| Relative Fit Index (RFI)                        | 0.991                   | $\geq 0.90$    | Good     |
| Goodness of Fit Index (GFI)                     | 0.999                   | $\geq 0.90$    | Good     |
| Adjusted Goodness of Fit Index (AGFI)           | 0.989                   | $\geq 0.90$    | Good     |

Even though the above goodness of fit indices shows a near perfect data to model fit, but the path diagram depicts certain undesirable outcomes. For instance, the real time data negates the notion that increases in sales and profitability depend on increase in number of employees. Similar is the case for net profit and value-added with pay and capital. This exposes Pakistani organizations for their lack of strategic thinking and rationality. Apart from this, one possibility is that it would take a year or two to have the effect of growth in inputs i.e., number of employees, pay and capital to become visible in growth figures pertaining to sales, net profit, and value-added or vice versa in the reverse cycles as increase in inputs i.e., number of employees, pay & capital should augment outputs i.e., sales, net profit & value-added and in turn the outputs shall result in enhancing the inputs. This process should ideally go on. If it is not so then there is definitely something wrong in the growth potential of the organization, a premise on which the proposed model is based upon.

Another anomaly highlighted in the path diagram is that growth in sales does not translate into growth in profitability or in other words growth in net profit should ideally stem from growth in sales but the path diagram defies this ideal notion in the case of sampled KSE-100 companies. This is possible due to an unfavorable regulatory regime or inability of the firms to leverage their profitability in the desired manner. Again, the results expose Pakistani top companies to be missing the right type of interventions on fundamental aspects.

### **Conclusion**

The aims of this study were to demonstrate and test the proposed organizational diagnostic model based on financial cum productivity analysis, which is useful to carry-out instant organizational diagnosis. Based on the case studies of the 51 sampled KSE-100 companies and the results of the structural equation modeling technique, it can be concluded with a degree of confidence that the proposed model can be used to diagnose business organizations of all types and sizes. The model can be used to get the desired insights into organizations for making required interventions. The ease of the use of the model has been amply demonstrated. The study also revealed areas where the actual data does not make sense. These are valuable insights for industry and academia to bring the much needed reforms.

### **Recommendations**

It is imperative to have critical reviews of the model from practitioners and academicians to add to the body of knowledge. There are different areas in which further research can be carried out. For instance, the value-added mix or ratio-components can be studied to analyze how organizations leverage their profitability, how much of the total wealth is shared with the employees or for that matter how much the government takes away in the form of taxes. As highlighted by Hashmi and Shakir (2014) in DAWN which is a leading daily newspaper of Pakistan, more than 55% of the wealth created by the giant Fauji Fertilizer Company, a market leader in fertilizer sector, in 2012 was appropriated to the national exchequer. While 25% of the wealth was distributed to the providers of the capital, only around 7% was the share in gains for the employees. The key point is that there are yardsticks to ascertain the share of employees, creditors, and investors etc., there is no yardstick to fix the share of government in corporate wealth.

In the light of this study the following policy interventions may be made by the Securities & Exchange Commission of Pakistan:

1. Inclusion of value-added or wealth statement in annual audited accounts may be made mandatory for all listed companies; and
2. A uniform or standardized format for presentation of value-added or wealth statement may be devised.

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