

Diagnosis for Effectiveness: Performance Assessment from a Diagnostic Measurement Perspective with Big Data

Jiyuan Zhang, Ph.D.¹, Cody Ding²

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ABSTRACT

Although traditional performance assessment of employees and organizations has the potential advantages, there are also potential problematic issues such as detrimental to quality improvement or negative perceptions. The purpose of this paper is to propose a diagnostic assessment framework for monitoring and improving performance of both employees and organizations. This framework is called "diagnosis for effectiveness," which provides information that needs to adjust managing strategies while they are still happening and guides both managers and employees in making decisions about future strategic actions. In addition, we suggest a big data approach via spatial models for evidence-based performance decision.

1. Introduction

A performance assessment of individuals, and ultimately organizations, should be a systematic and periodic process that assesses an individual employee's job performance and productivity in relation to certain pre-established criteria and organizational objectives (Abu-Doleh & Weir, 2007; Manasa & Reddy, 2009) in addition to other aspects of individual employees such as organizational citizenship behavior, accomplishments, potential for future improvement, strengths and weaknesses (Broady-Preston & Steel, 2002; Manasa & Reddy, 2009; Muchinsky, 2006). A fundamental reason for use of performance assessment or evaluation is to improve job performance both at the individual employee level and, more importantly, at the organization level (DeNisi & Pritchard, 2006). As DeNisi and Pritchard(2006) indicated, performance assessment can be (1) a basis for employment decisions (e.g. promotions, terminations, transfers), (2) a criteria in research (e.g. test validation), (3) to aid with communication (e.g. allowing employees to know how they are doing and organizational expectations), (4) to establish personal objectives for training programs, (5) for transmission of objective feedback for personal development, (6) a means of documentation to aid in keeping track of decisions and legal requirements (DeNisi & Pritchard, 2006), and (7) in wage and salary administration (Muchinsky, 2006). Moreover, performance assessment can help in the formulation of job criteria and selection of individuals who are best suited to perform the required organizational tasks(Manasa & Reddy, 2009). At the organization, performance assessment can be part of guiding and monitoring employee career development(Spinks, Wells, & Meche, 1999), which can also be used to enhance work motivation.

Despite all the potential advantages of performance assessment, there are also potential problematic issues. It has been noted that determining the relationship between individual job performance and organizational performance can be a difficult task(Twomey & Harris, 2000). Generally, there are two overarching problems from which several complications may arise. One of the problems with performance assessment is that there can be detrimental effects to the organization(s) involved if the assessments are not conducted and used appropriately. The second problem is they can be ineffective if the measurement system does not correspond with the organizational culture and system(Schraeder, Becton, & Portis, 2007). These two overarching problems may involve some specific issues:

- Detrimental to quality improvement: it has been proposed that the use of traditional performance evaluation systems in organizations adversely affect organizations' pursuits of quality performance(Soltani, 2005).

¹ Department of Human Resources, Nanjing Urban Construction Investment Holding (Group) Co., Ltd, Nanjing, China, Email: jiyuan_zhang@sohu.com.

² Department of Educational Psychology, Research, &evaluation, University of Missouri-St. Louis, St. Louis, MO, USA, Email: dinghc@umsl.edu

- Negative perceptions: Quite often than not, individuals have negative perceptions of performance evaluation (Pettijohn, Parker, Pettijohn, & Kent, 2001). Receiving and/or the anticipation of receiving a performance evaluation can be uncomfortable and distressful (Spinks et al., 1999) and potentially cause conflict between supervisors and subordinates (Jenks, 1991). If the person being appraised does not trust their employer, appraiser, or believe that they will benefit from the process it may become a "check box" exercise (McGivern & Ferlie, 2007).
- Errors: Performance evaluation should provide accurate and relevant ratings of an employee's performance as compared to pre-established criteria/goals (i.e. organizational expectations; Amsterdam, Johnson, Monrad, & Tonnsen, 2005). Nevertheless, managers will sometimes rate employees more favorably than that of their true performance in order to please the employees and avoid conflict (Schraeder et al., 2007), resulting in inflated ratings (Martin & Bartol, 1998).
- Legal issues: when performance evaluations are not carried out appropriately, legal issues could result and place the organization at risk (Jenks, 1991). Since performance evaluations are used in organizational disciplinary programs (Spinks et al., 1999) as well as for promotional decisions within the organization (Schraeder et al., 2007), the improper application and utilization of performance evaluations can affect employees negatively and lead to legal action against the organization.
- Performance goals: performance goals and performance evaluation systems are often used in association. Negative outcomes concerning the organizations can result when goals are overly challenging or overemphasized to the extent of affecting ethics, legal requirements, or quality (Schweitzer, Ordonez, & Douma, 2004). Moreover, challenging performance goals can impede on employees' abilities to acquire necessary knowledge and skills (Kanfer & Ackerman, 1989).
- Derail merit pay or performance-based pay: the deficit in merit pay and performance-based pay is linked to the fundamental issues related to performance evaluation systems (Selden, Ingraham, & Jacobson, 2001).

Given these potential problems, not everyone is in favor of the traditional performance assessment systems. Many employees, including management, especially those most affected by such ratings are not very enthusiastic about them. For example, managers who have had unsatisfactory experiences with inadequate or poorly designed assessment programs may be skeptical about their usefulness and they may not like to play the role of a judge and be responsible for the future of their employees. This tendency can lead them to inflate their assessments of the workers' job performance, giving higher ratings than deserved.

Thus, performance assessment may become ineffective because of employee's negative reactivity to the evaluations themselves. The concept of reactivity explains that evaluations meant to assess performance are often rendered futile because they affect employee performances (Espeland & Sauder, 2007). In other words, many performance assessments do not accurately measure performance because employees react to being observed and evaluated, which may make evaluations appear unable to serve their purposes. Thus, the merits of the value and enduring existence of performance evaluations that lead employees to react and alter their behaviors is questionable.

2. Diagnostic Measurement Perspective

The word "diagnosis" means (a) to know precisely, (2) to decide, and (3) to agree upon. In other words, a diagnosis is essentially the act of analyzing a problem and identifying its causes for the purpose of classification-based decision making. Diagnosing problems is an essential component of everyday life. For example, deciding on the means for better managing a financial budget or choosing the best neighborhood to live in are diagnostic problems experienced every day. The objective is typically to improve the situation so that the problem is remedied via a suitable intervention. Deciding on how to improve the situation requires a reliance on the resources that already exist so that the most effective intervention for the purpose at hand can be designed. Thus, the purpose of diagnostic assessment is similar to everyday diagnosis, but the context within which the diagnosis takes place is typically at workplace. For example, an entity for whom a diagnosis is desired could be an employee or organization who needs improvements in certain areas (e.g., more productivity or more sales). The motivation for engaging in diagnostic measurement may include diagnosing the strengths and weaknesses in a particular domain and determining the best improving strategies for the entity. Thus, in contrast to traditional performance assessment, diagnostic

measurement is a formative process in that it provides information that needs to adjust managing strategies while they are still happening. The process serves as practice for the organization and a check for effectiveness during the working process. Thus, diagnostic measurement process guides both managers and employees in making decisions about future strategic actions.

Some examples of sampling types of measurement components generated from the diagnostic measurement process may include the following.

1. The manager meets with employees to discuss a specific targeted skill or performance. The manager can record the employee's progress toward the organization-based standard and what is the next step for them.
2. The manager asks targeted questions and records informally employee's responses. This can be done whole group or small group. Later this information can be transferred to the organization's 'strategic discussion' log.
3. Employees demonstrate knowledge and implementation on a specific set of standards by performing required tasks. A rubric is used and the employees are evaluated via this document.
4. Challenge employees to demonstrate higher level thinking by asking challenging questions such as asking them to explain, justify, imagine or defend.
5. Employees reflect on their performance, assess where they are in the continuum, and explain how they feel a performance reflects what was expected.

As can be seen from these examples, the diagnostic measurement can include individuals, groups, or organizations, which provide data that can be used to obtain classifications. As such, diagnostic measurements play a serving role in determining suitable intervention plans for improvements. It is a mistake to view diagnostic measurements as consisting only of standardized norm-referenced tests or questionnaires. The key point is that employee involvement in the diagnostic measurement process rather than the passive recipients of evaluation. Diagnostic measurement hinges on developing employees' capacity to monitor the quality of their own work during production. Accordingly, the indispensable conditions for improvement are that the employees comes to hold a concept of quality roughly similar to that held by the organization, are able to monitor continuously the quality of what is being produced during the act of working itself, and have ability to know precisely what the problems may be and to decide alternative moves or strategies that are in agreement with the organization goals.

More specifically, diagnostic measurement process involves three overarching questions, which can be called "diagnosis for effectiveness":

1. Where are we going? (identify and communicate the performance goals);
2. Where are we right now? (diagnose current levels of performance);
3. How can we reach the goals? (help the employees or organization with strategies and skills to reach the goals).

There are seven strategies for addressing these three questions. In the following, we describe these strategies according to the corresponding questions. Please note that these strategies are not new--they reflect practices that have been around for years in education. What may be new is their intentional use in the context of employee evaluation at any organizations, focusing on the employee as the most influential decision maker in the organization context for improving organization effectiveness.

A. Where are we going?

Strategy 1: Provide employees with a clear and understandable vision of the required target.

Motivation and achievement both increase when goals are guided by clearly defined targets. Activities that help employees answer the question, "What's the expected?" set the stage for all further diagnostic assessment actions.

Strategy 2: Use examples and models of strong and weak work.

Carefully chosen examples of the range of quality can create and refine employees' understanding of the performance goals by helping them answer the questions, "What defines quality work?" and "What are some problems to avoid?"

B. Where are we right now?

Strategy 3: Offer regular descriptive feedback.

Effective feedback shows employees where they are on their path to attaining the intended goals. It answers for employees the questions, "What are my strengths?"; "What do I need to work on?"; and "Where did I go wrong and what can I do about it?"

Strategy 4: Require employees to self-assess and set goals.

The information provided in effective feedback models the kind of evaluative thinking organization want employees to be able to do themselves. Strategy 4 helps employees to identify their strengths and weaknesses and to set goals for further actions. It helps them answer the questions, "What am I good at?"; "What do I need to work on?"; and "What should I do next?"

C. How Can we reach the goals?

Strategy 5: Design expected goals to focus on one behavior target or aspect of quality at a time.

When diagnostic information identifies a need, organization can adjust requirement to target that need. In this strategy, organization scaffold performance by narrowing the focus of a goal to help employees to address specific misconceptions or problems.

Strategy 6: Ask employees focused revision.

This is a companion to Strategy 5-when a concept, skill, or competence proves difficult for employees, we can let them practice it in smaller segments, and give them feedback on just the aspects they are practicing. This strategy allows employees to revise their initial work with a focus on a manageable number of performance targets or aspects of quality.

Strategy 7: Engage employees in self-reflection, and let them keep track of and share their experiences.

Long-term retention and motivation increase when employees track, reflect on, and communicate about their experiences. In this strategy, employees look back on their journey, reflecting on their performance and sharing their achievement with others.

It should be noted that the seven strategies are not a recipe to be followed step by step, although they do build on one another. Rather, they are a collection of actions that will strengthen employees' sense of self-efficacy, their motivation to try, and ultimately, organization effectiveness. They represent a use of diagnostic information that differs from the traditional performance appraisals associating employee evaluation with tests. Diagnostic measurement ask organization to think more broadly about what assessment is and what it is capable of accomplishing. More importantly, since diagnostic measurement process is open and constructive rather than judgmental, it can be useful to identify issues that are likely to impact on employee's willingness to stay with organization in the longer-term. The diagnostic measurement provides a good opportunity for a "check- up" regarding employee's satisfaction with their working conditions and environment, and a discussion of strategies to address any problem or issues.

3. A Big Data Approach

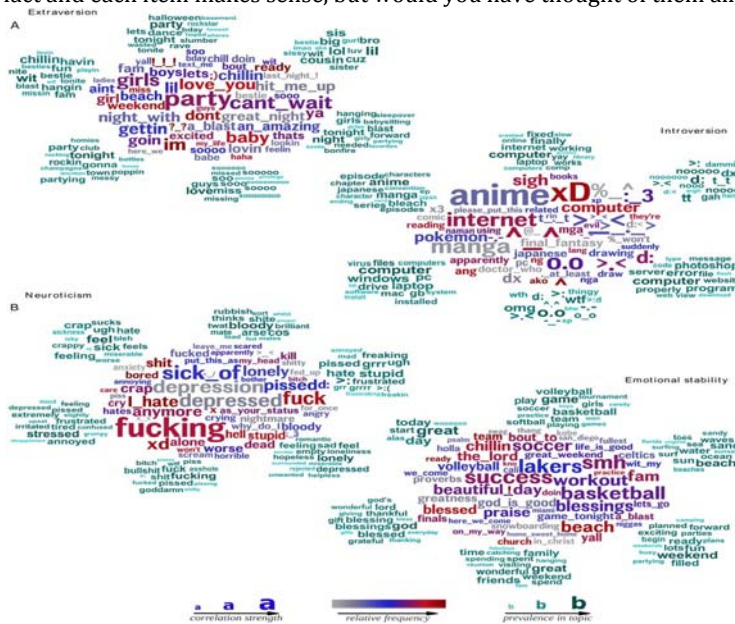
Given the framework of diagnostic measurement that is based on various operational or behavior measures of performance along with the various perspectives from which the data come from, but no one factor provides a clear indication of productive or ineffective performance, there will be so many measures of evaluation and consequently, multiple sources of information from diagnostic measurement. This dependence on performance measures has not diminished in recent years, and on the contrary, the number of metrics that exist is growing at an even more accelerated rate (Muchinsky, 2006). Today, in addition to financial measures, organizations examine nonfinancial metrics regarding leadership, information, planning, human resource utilization, and customer satisfaction (Muchinsky, 2006). This proliferation in performance measurements has led to corresponding growth in data.

However, both individuals and organizations disagree about how best to define and measure performance (Espeland & Sauder, 2007; Kanfer & Ackerman, 1989; Muchinsky, 2006). For example, many performance measures, even those that are most commonly used, tend to show little to no correlation with one another (Muchinsky, 2006). A multitude of studies has found that accounting and financial performance measures do not correspond closely, and that measures of reputational performance indicators do not correspond with accounting and financial performance measures (Espeland & Sauder, 2007; Kikoski, 1999; Muchinsky, 2006). That these measurements have such weak relationships with one another makes it difficult to evaluate the overall performance of an organization.

In recent years, big data becomes a popular term that is used to describe the exponential growth and availability of data, both structured and unstructured. And big data may be as important to business - and society - as the Internet has become. Why? More data may lead to more accurate analyses. More accurate analyses may lead to more confident decision making, and better decisions can mean greater operational efficiencies, cost reductions, and reduced risk.

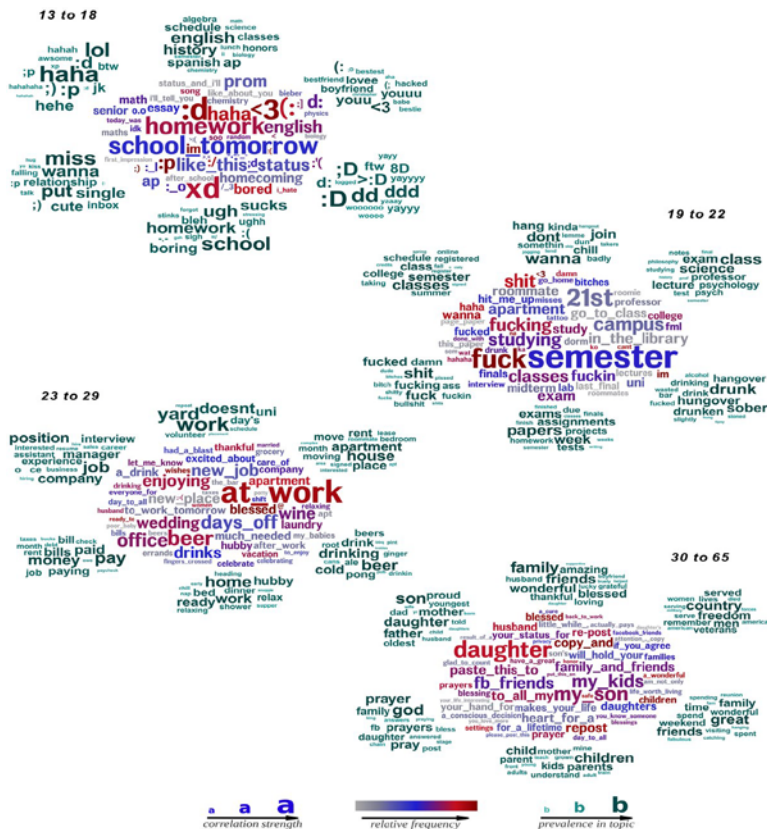
As industrial analyst Scott Zucker indicated, small data is gone, and data is just going to get bigger and bigger and bigger, and people just have to think differently about how they manage and use it. Industries provide the now mainstream definition of big data as the three Vs: volume, velocity and variety, plus variability, and complexity.

How can organizations make the most of all that data, now and in the future for diagnostic measurement? This is a twofold proposition. Organizations can optimize their success if they weave analytical tools into the solution for performance effectiveness. But they also need analytical methods to help them to utilize the data for such a purpose. Figure 1 below shows an example that illustrates how to use big data to describe the relationships between language use and personality. Specifically, a team of researchers from Pennsylvania State University created word clouds that “provide an unprecedented window into the psychological world of people with a given trait,” as described in a press release. “Many things seem obvious after the fact and each item makes sense, but would you have thought of them all, or even most of them?”³



By age:

³Read more: <http://www.businessinsider.com/facebook-study-on-language-and-personality-2013-10#ixzz2o4NvhRih>



By Gender:

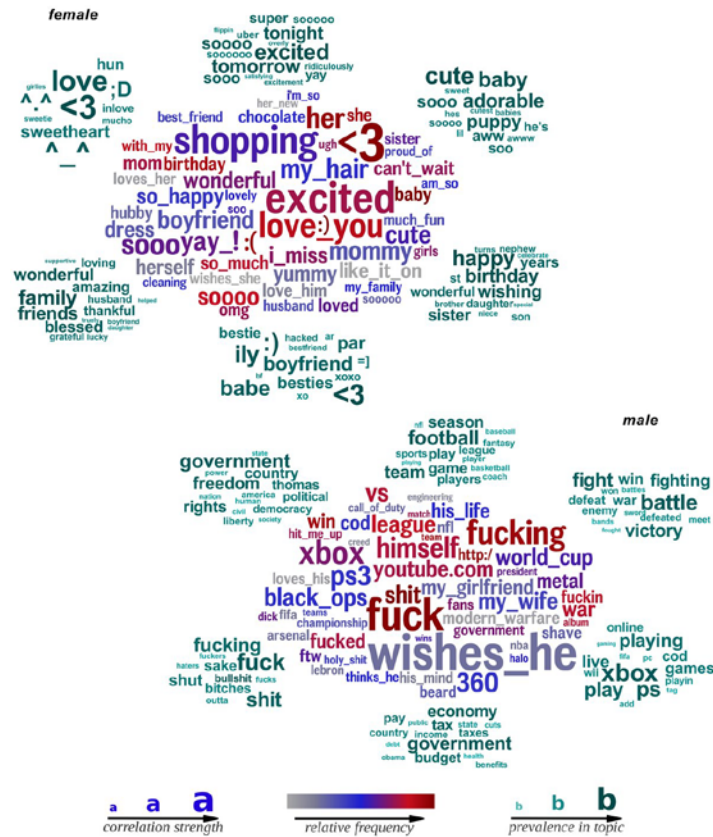


Figure 1. An example of visual analysis of relationships between language use and personality using big data.

As Martin Seligman from the research team explained why the new approach trumps previous methods: “When I ask myself, ‘What’s it like to be an extrovert?’ ‘What’s it like to be a teenage girl?’ ‘What’s it like to be schizophrenic or neurotic?’ or ‘What’s it like to be 70 years old?’ these word clouds come much closer to the heart of the matter than do all the questionnaires in existence.”

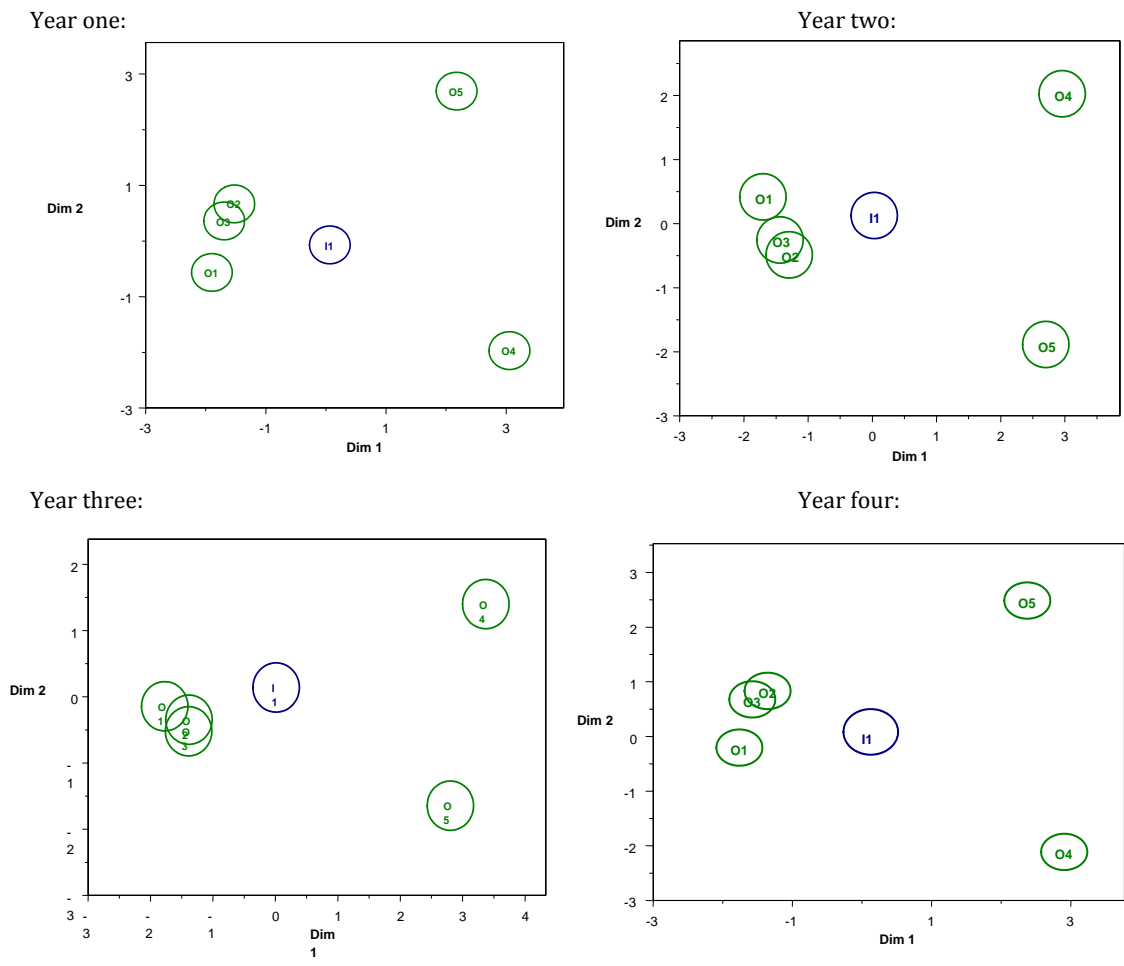
How can we go about analyzing data from diagnostic measurement with other available data? As we have seen in the example here, we can utilize knowledge-space model via multidimensional scaling (MDS). As the name implies, the aim of knowledge-space model is to structure the space of attribute combinations that represents the collectively possible knowledge measured by variety of data. There are much to be done in big data analysis using spatial model. In this paper, I merely suggest some possible alternative such as MDS in such an endeavor.

In much of the quantitative and statistical literature, multidimensional scaling (MDS) is often referred to as a technique that represents the empirical relationships of data as a set of points in a space, typically in two or higher dimensional spaces. Traditionally, multidimensional scaling represents a family of statistical methods or models that portray the structure of the data in a spatial fashion so that we could easily see and understand what the data indicate. This may be the reason that MDS tends to be viewed as a data visual technique. The unifying theme of different MDS models is the spatial representation of the data structure. In a nutshell, MDS can be defined as a family of analytical methods that use the geometric model (typically in the form of a distance equation) for analysis of inter-relationships among a set of variables or people, and each of these methods has its own uniqueness but also overlap to some degree with other models in terms of what each model can accomplish. Readers interested in MDS can read related literature and I will not use space for such a discussion. Instead, I will provide an example of MDS single-ideal point model for modeling individuals' behavioral preference. We have yet to see how MDS can be used for big data modeling.

As indicated by MacKay (2006), a probabilistic MDS single-ideal point model requires a single-ideal solution to be estimated. As an unfolding model, a single-ideal solution represents both individuals and behaviors as

a point in Euclidean space. With the assumption of dependent sampling and that all individuals share the same latent MDS space, the model estimates one ideal point and n points that represent actual items or variables across all individuals at a given time. The distance relation between individuals and behaviors provides information about the preference structure of the individuals at that time point in such a way that individuals are closer to the behaviors they prefer. In other words, the preference rating or ranking data provide information about individuals' latent ideal or typical behavior choice with respect to a set of behaviors, and the estimated coordinates are latent spatial structure or configuration that include both individuals' ideal point and the points of actual behaviors. The following example illustrates these concepts.

In this example, we examined what aspects of employees' social behaviors managers typically focused on assessing based on data collected from an advertising firm. The specific questions are (1) what aspects of employees' social behaviors the managers tended to focus on and (2) whether such a focus of managers' assessment of employees' social behaviors changed as time goes on. Five employees' social behaviors were included: Approaches to Learning, which assessed the ease with which employees can benefit from the working environment; Self-Control, which assessed the employees' ability to control behavior; Interpersonal Skills, which assessed the employees' skill in forming and maintaining friendship; Externalizing Problem Behaviors, which assessed acting out, and Internalizing Problem Behaviors, which assessed the apparent presence of anxiety, loneliness, low self-esteem, or sadness. The results of analyses are shown in Figure 2 below.



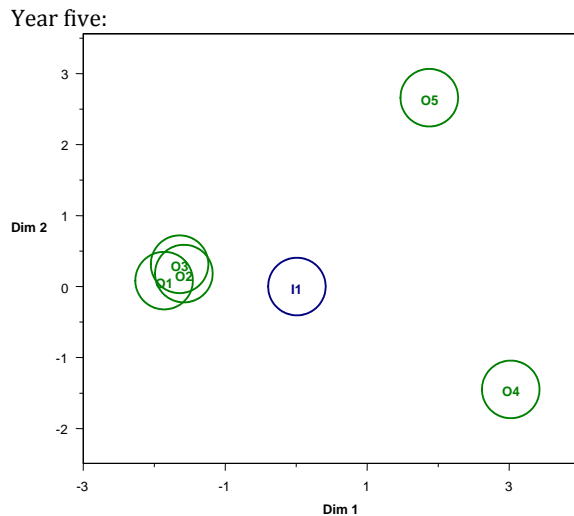


Figure 2. Configuration of manager rating on employees' social behaviors at each assessment occasion. O1- Approaches to Learning, O2-Self-Control, O3-Interpersonal Skills, O4-Externalizing, and O5-Internalizing Problem Behaviors. I1-ideal point.

As can be seen in Figure 2, approach to learning, self-control, and interpersonal skills were closely together and they were also closer to the managers' ideal point. On the other hand, externalizing and internalizing problems were far apart from the other behaviors and further away from the managers' ideal point as well as away from each other. This configuration pattern was consistent across time. Thus, from Figure 2, we may draw two conclusions. First, managers tended to focus on approaches to learning, self-control, and interpersonal skills, but less on externalizing or internalizing problem behaviors. Second, such a pattern of preference on managers' assessment of employees' social behaviors was likely to remain stable over time. This finding was further supported by Procrustes analysis, the results of which indicated that the general similarity model index, P_0 , ranged from .94 to .98, with a median of .97, suggesting the configuration similarity of managers' rating over time.

4. Conclusion

Everyone organization, irrespective of its size, has an appraisal system for its employees. This implies the performance appraisal has become an indispensable activity in any organization. The purpose of this paper is to propose diagnostic measurement an alternative for traditional performance evaluation. The main advantage of such an approach is that it may avoid the potential complications associated with traditional performance evaluation such as negative perceptions or demoralization on the part of employees so that the organization performance suffers. Since no monitoring is done to find out any loopholes in the performance appraisal system and if it exists, it is on informal basis, new methods of appraisal should be adopted so that both appraiser and the appraise take interest in the evaluation process. The proposed diagnostic measurement process may not eliminate the performance gap at the level of individual employees and at the level of organization since too many factors may at work to be completely overcome by one evaluation approach. However, the approach will take performance evaluation farther in that direction by helping employees reclaim assessment or evaluation as an integral part of positive working experiences. The strategies of Diagnosis for Effectiveness offer a sequence of effective evidence-based practices that develop in employees the patterns of thought they need to substantially improve their own performance, and in doing so, they will introduce employees to the motivational power of being in control of their working conditions of success. Assessment can be our friend--it can even be fun. And it can be the employees' friend, too. Ultimately, diagnostic measurement process is a good opportunity to discuss employee's health and well being in the workplace, particularly in regard to factors that contribute to feelings of stress and experiences that promote satisfaction with their work.

Furthermore, in this paper we suggest that big data analytical approach via spatial models may provide a new method for human resources managers to get insight about effectiveness of employee performance and ultimately the organization performance. Companies will grow increasingly data driven and willing to apply analytics-derived insights to key business operations. Intuitive decision-making will diminish somewhat as companies incorporate data-based analytics into everything that employees touch. In addition, the explosive growth of social media, mobile devices, and machine sensors is generating a wealth of bits that either do not exist or were not accessible a few years ago. Some of this data is generated within an organization, along with a larger percentage comes from the outside -- Twitter streams, for instance. Thus, diagnostic measurement will find more ways to harness this mix of structured and unstructured data, ideally helping human resources managers and organizations better address the needs of their employees and customers. The diagnostic measurement is built upon the integration of comprehensive data and responsive science. The big data approach for diagnostic measurement must be utilized to investigate whether humanity's use of nature's life-supporting services is sustainable or not. Just as regular doctor visits can help keep people healthy, the early detection of planetary problems is crucial to organization's survival.

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