

# Determining The Contribution Of DEA Efficiency Using Shapley Value.

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**Abstract**— Performance measurement is one of the ways to evaluate the success of an organization. Many organizations have designed their own measurement systems to reflect the needs of their current business. However, the organizations only consider the efficiency from a result regardless of the impact on that efficiency to the efficiency from other results. Knowing the contribution of particular efficiency to the entire process leads to the ease of managing activities. In this reseach, we combined two techniques: Data Envelopment Analysis (DEA) and Shapley Value. We use DEA to determine the efficiency of the activities dan Shapley Value to determine how important that efficiency to entire process. This new method can be used to determine whether the efficiency of the process is balanced or not. Imbalance in efficiency will create some problems, for example imbalance of resources allocation.

**Keywords**—*Performance Measurement; Data Envelopment Analysis; Shapley Value*

## I. INTRODUCTION

Every business activity is a production process and an organization is a complex set of processes with multiple inputs, production processes, outputs, and customers. Business processes are much like machines; they do the same or similar things day after day and for that reason, their performance must be measured on a regular basis. Performance measures are tied to a goal or an objective or the target of the organizations by providing information such as, how well the organization is doing, If the organization is meeting their goals, If the organization's processes are in statistical control and where improvements are necessary.

Performance measurements are necessary because if we cannot measure an activity, we cannot control it and if we cannot control it, we cannot manage it. Without dependable measurements, intelligent decisions cannot be made. Therefore, many performance evaluation techniques have been developed to meet the requirements of variuos business processes. Among them include Key Performance Indicator (KPI), Data Envelopment Analysis (DEA), and Game Theory.

