

2.3: Productivity

In operations, we love to measure. One of the key ways we judge our operational performance is by using a simple wholistic measure, which is productivity.

Productivity is referred to as a relative measure. It has little meaning in isolation but does tell a story when it is compared to the previous period, or to a similar department or organization. The key thing we pay attention to is whether the productivity has improved or declined or stayed the same. Let's look at several types of productivity measures, and how to calculate the percent change.

Examples of Productivity Measures		
Partial Productivity	Multi-factor Productivity	Total Productivity
$\frac{\text{output}}{\text{labour}}$ $\frac{\text{output}}{\text{energy}}$ $\frac{\text{output}}{\text{materials}}$	$\frac{\text{output}}{\text{labour} + \text{materials}}$ $\frac{\text{output}}{\text{energy} + \text{labour} + \text{materials}}$	$\frac{\text{output}}{\text{all inputs}}$

Figure 2.3.1: Examples of equations for productivity measures.

Percent Change

$$\text{Percent Change} = \frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100\%$$

If the result is positive, it is an increase.
If the result is negative, it is a decrease.

Figure 2.3.2: Percent change calculation; Credit: onlinemathlearning.com/percent-change-algebra.html

Output is always a reflection of how much the firm was able to produce. If the product is homogenous, meaning it has very little variations, then expressing output as the number of units produced may be reasonable. If, however, the firm makes a variety of products with different levels of labour and material costs, then the output would likely be described by the dollar value of all the goods produced within a certain time period.

For **inputs**, dollars spent are typically used as the measure. Several exceptions might be labour hours, gallons of water, or kilowatts of electricity. Firms will typically measure the productivity for the things which represent significant expenditures. A farmer might measure the pounds of meat produced as the output and the pounds of feed consumed as the input. Some other common productivity measures can be found below.

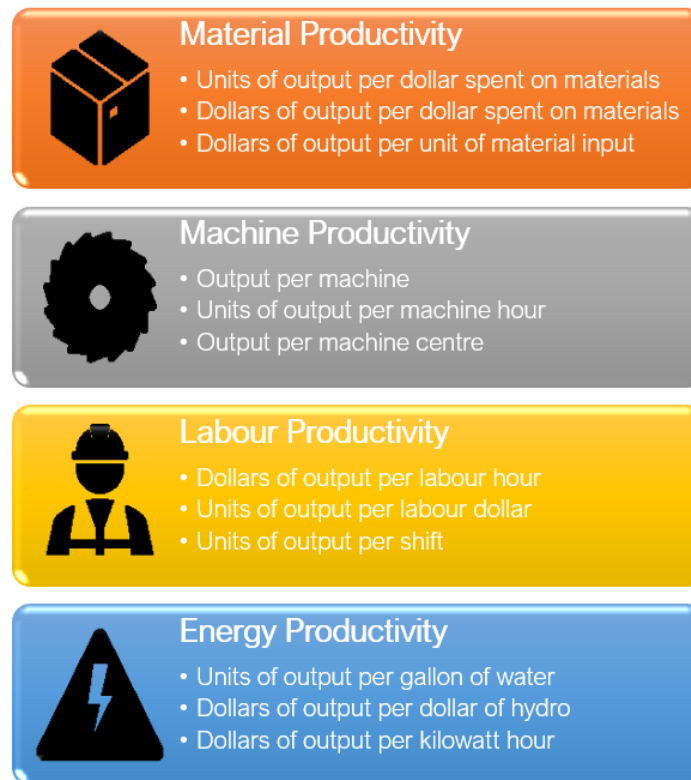


Figure 2.3.3: Examples of productivity measures.

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