Normalized Productivity

By Farid Saddik

The universally-recognized abstract definition of productivity is the ratio of output to input.

Construction and other industries today have adopted a narrow subset of productivity and generalized it as "the" productivity. Construction productivity, as utilized today, is not a useful metric to rely on for monitoring project health, creating reliable cash flow and forecasts, deriving schedule durations, or evaluating claims.

The productivity methods currently utilized fail to consider that true productivity requires a complete set of "inputs" and a complete set of "outputs" both additive and subtractive, and not just the number of widgets per labor unit. While input and output components vary from task to task, they are almost never as simple as the ratio of a single output to a single input.

When we define and understand the various components involved in a task input and output, we develop a real picture of the task performance to-date and are able to assess means to improve real productivity going forward. If the assessment is for forensics purposes to evaluate a claim for example then understanding all the components of input and output is key in assessing the effect of various claim factors on real productivity.

Let's examine examples of input components. Perhaps the obvious first component is labor hours. That information would however be incomplete unless we know, for instance, what equipment was used to perform the task. If the same task can be completed utilizing 200 labor hours and equipment A which costs $20 per hour, would it be proper to say it is more productive if the same task takes only 150 labor hours by utilizing equipment B which costs $100 per hour?

The answer is we do not really know until other input components are also identified, analyzed, and factored into the input. The simple fact though is that the single component of labor is nowhere near sufficient to assess productivity for a given fixed scope. Furthermore, to say we can assume all other factors are the same is an unrealistic assumption that is invalid for any situation, with perhaps a few rare exceptions.

For the example above, in addition to labor units and equipment units and type, other factors to consider for input may include components such as labor unit cost, skill level, type of pay, production rate, need for season adjustments, support staff requirements, pre-processing requirements, safety modifiers, and quality modifiers. Depending on the project, project geography, specific task requirements, and contractual requirements, other components may also become part of the input side of real productivity.

Let's now examine the output side of real productivity. Current construction productivity is generally satisfied that the number of widgets is the only output component. Such approach to productivity fails, with potentially serious consequences, to consider the quality of the output product. We've all seen variations of the example where the cubic yards of concrete per labor unit is great, but elsewhere in the job cost report there is an astronomical cost for "Patching and Finishing". In essence, the construction

productivity culture breeds sloppiness by promoting speed at the expense of quality. Unfortunately, the same sometimes applies to safety. Both the potential for poor quality and poor safety practices are examples of subtractive output. While there are some adjustments that can be made to the job cost structure to remedy a portion of the missed quality output component, these measures are only partial, not readily implemented, and come at a trade-off.

The impact a task has on the project schedule may be weighted as an output component. The schedule is generally affected by production rates, which may be a direct input component, but the time impact is an output that might have deeper ramifications, such as program-wide impact or project portfolio impact.

The Normalized Productivity approach insures a metric that minimizes assumptions and incorporates available data for the most accurate productivity picture.

To normalize productivity, all input and output components need to be identified and analyzed. A model is then constructed accounting for each component contribution and weight, as applicable. The final normalized productivity is expressed as a ratio of the normalizing output to the normalizing input.

The challenges with normalized productivity are mainly the lack of industry awareness and the lack of software tools to facilitate compiling and processing the data.

An accurate productivity picture is vital for providing accurate project status, cash flow projections, forecasts, project portfolio projection, and enterprise asset utilization. It is also crucial in understanding, accurately evaluating, and processing claims.