
Three Ways to Increase Productivity - Denominator, Numerator, and One More Method

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Productivity is a kind of efficiency

In Japan, where the population is declining, improving productivity has become a critical issue. Although this issue has been discussed from various perspectives, I would like to return to the basics and consider it simply.

Productivity is the ratio of the amount (value etc.) of a product to the amount of a resource, i.e. a kind of efficiency. Focusing on the product (numerator), we get concepts such as physical productivity and value-added productivity. Meanwhile, focusing on the input resources (denominator) brings about concepts like labor productivity, capital productivity, and total factor productivity. The scale of both the denominator (such as quantity or value of products) and numerator (number of working people or hours of labor) also affects the perception of productivity. We must choose appropriate denominator and numerator scales according to our objective and situation.

Practically the productivity of each production process, or for each element and function of the product, may be considered. For example, the fuel efficiency (productivity) considered on long-distance buses mainly driving highways would differ from the one considered on city buses with frequent starting and stopping.

Ways to improve efficiency: Denominator and numerator

As mentioned earlier, productivity is efficiency. It is the amount of product divided by the amount of input. Based on this calculation, the basic methods of increasing productivity are either "increasing the numerator (product)" or "decreasing the denominator (input resources)."

Generally, from a management perspective, controlling the denominator is easier than the numerator. Companies can decide the amount of input themselves. But the numerator is subject to technical and market uncertainties (such as whether the product will be sold or not). Thus, it is difficult to ensure a consistent increase of numerator. Furthermore, new products or technologies involve significant uncertainty.

In addition, measures to reduce the denominator, such as labor reduction or capital policies like share buybacks, generally have immediate effects compared to numerator measures. Therefore, it is understandable that companies seeking to improve their return on equity (ROE - the productivity of net income against equity) often resort to denominator policies (to reduce the denominator) like share buybacks. The approach of "selection and concentration," which is used in Japan mainly as discarding inefficient and unprofitable departments, was once popular and also supported by investors.

Potential sustainability crises arising from denominator-only policies

However, reducing the denominator solely is not easy. Denominator policies often accompany a slight decline in the numerator or a reduction in resources necessary for the expansion of the numerator. Thus, it potentially results in a slow, shrinking equilibrium. On a company level, future sustainability could be endangered, and on a national level, it might lead to a shrinking economy. Hence, it is crucial to not only conduct denominator policies but also tie freed resources to numerator policies by investing them in new areas for increasing the numerator.

Numerator policies require ample time

On the other hand, policies for increasing the amount of product (numerator policies) fundamentally enhance productivity. Nevertheless, such policies generally lack immediacy and require considerable time.

Additionally, as mentioned earlier, uncertainties in technology and market demand sufficient capital.

Such long-term policies may reduce capital efficiency in the short term. Hence, for numerator policies, detailed explanations are required to shareholders and investors under the financial statement systems basically one-year-term based.

Accounting movements that facilitate better evaluation of numerator policies, such as recognizing intangible assets and enhancing disclosures related to sustainability and human capital, are advancing. Furthermore, some investment products like mutual funds are appealing

to customers by offering investments with long-term views through dialogues with their portfolio companies. Numerator policies also contribute to the expansion of the national economy, so I hope such efforts of stakeholders would continue.

And one more method: Which productivity should be evaluated?

Once the methods for calculating productivity are fixed, increasing productivity typically involves two approaches: denominator policies (reducing the denominator) and numerator policies (increasing the numerator). However, revising the measurement scale of productivity itself should also be noted as a method for practically improving productivity.

Of course, changing criteria merely to improve appearances (window dressing) does not lead to real productivity improvement. However, the change of environment and business content often gives the change of productivity to be evaluated.

For example, consider the productivity (efficiency) of electric circuits. A switching power supply circuit (switching circuit) adjusts and stabilizes the voltage of a DC power source. It can convert voltage with high efficiency (input-output power ratio), for example, exceeding 80%.

Yet, surprisingly, when a switching circuit is connected directly to a solar panel, the output power can sometimes be less than half of the power generated by the solar panel in case not connected.

The reason for the efficiency drops lies in the operating principle of the switching circuit. The switching circuit controls the power by rapidly switching the input on

and off, converting and flattening the reduced input power to the desired voltage, and achieving a stable output voltage. Essentially, in the words of this report, it is a circuit that attains high efficiency through the denominator policy (limitation of input power).

The circuit performs well with inputs that are nearly constant and controllable. In such cases the circuit is effective, losing little power to heat, compact and lightweight. When charged based on actual power consumption from household electricity outlets, efficiency of the circuit lowers electricity bills.

However, when we connect a switching circuit directly to a solar panel, the solar panel rests when the input is cut off by the circuit. It leads to lower efficiency compared to uninterrupted operation of the solar panel when it is alone. To maximize the efficiency to the power generation capacity of the solar panel, not to the controlled input, it is necessary to make some measures like adding power-storing circuits for the cut-off input.

While switching circuits are efficient, their efficiency pertains to the power ratio between input and output, making them more suitable for power sources like thermal power plants where output control is easy. For solar panels, where full utilization of natural energy is crucial, measuring the efficiency based on the ratio of output power to the power generation capacity might be more appropriate.

Focus on productivity relative to valuable input resources

I have provided an example illustrating how the aspect of productivity to be evaluated can change with environmental

and business changes. So, what kind of productivity should be the focus to truly improve productivity?

Generally, considering productivity from the perspective of the denominator, it is important to focus on productivity relative to the most valuable resources required. From a process perspective, focusing on the bottleneck process that significantly affects the overall productivity would be effective.

In Japan, human resources (labor) and energy will likely become increasingly valuable resources in the future. One potential solution is the use of IT. But, as seen in issues on power consumption by generative AI, trade-offs may emerge. Thus, energy efficiency might become more crucial. On the other hand, the efficiency related to land, for example, may become generally less important.

I hope this article serves as a helpful guide for you in considering true productivity improvement.

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<https://www.dlri.co.jp/report/dlri/448941.html>

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