

The Productive-Investment-Participation Model – A Motivation Tool for Production Development

By K. Westerhoff

Outline

- 1. The relevance of the Productive-Investment-Participation Model to productive and optional employees.*
- 2. Conduct of Leadership and Performance Goals*
- 3. Evaluation Points of the Productive-Investment-Participation Model*
- 4. Advantages of and Uses for the Productive-Investment-Participation Model*
- 5. Comments – References*

Abstract

Up to now reward systems, such as piece work and bonus systems, have often been unable to achieve what they were originally put in place to achieve. Performance evaluations are often not carried out properly and piece work systems are usually based on work flow. Additionally, the handling of production interruptions, due to a lack of materials or for setting up, is dealt with.

Measures for a continual improvement process are often not realised in performance compensation. There is often a lack of incentives for the improvement of production results. Therefore, many measures for a continual improvement process produce no results. Many inactive time reserves are arising, and resistance against change is increasing. If the deficiencies in the previous reward systems are sufficiently established, the question arises, if the systems should be added to or domes away completely.

The “Participate-With-Winner Method”, which is to be presented in the following pages, does not acknowledge only the result, but places result improvement in the forefront. The author registered this model as “PI-Methode®” (“PI-Method”)(Productive-Investment-Participation Model).

Keywords

Attendance, Work costs, Result contribution, Individuality, Productivity, Production time, Complaints, Distribution assessment principle, Net product assessment, Net production, Net product distribution.

1. The relevance of the Productive-Investment-Participation Model to productive and optional employees.

The previously common initiative models have been subjected to change in goal-oriented and contemporary businesses. In the future these methods should offer initiatives for result-improvement in connection with Motivational leadership methods to all employees, as well as correlate with the given specific work-organisation. A significant gap exists in this area. The PI-Participation model described in this article provides a way to connect the work costs and invested time with a productive increase in performance. The “investment notion” discussed in this context is to be understood as employees also investing in the business. An additional financial initiative can motivate employees to be creative and to improve productivity.

The experiences with the model to date have been predominantly positive. The performance given by productive and optional employees is measured as output (for example the quantity or completed amount of work) divided by the time present. No interferences, additional time, set-up time, lack of materials or extra work will be deducted from the time as they constitute part of the time that an employee must spend at work. In an extreme case all productive and optional employees are present (and thus spend time at work) and produce nothing. Therefore, productivity is not 100% or more, but rather zero.

Deletions often originate in the areas of planning and odd jobs, for example in material disposal, construction, lack of subscriptions, erroneous scheduling in the working plan etc. Optional employees, though, are not usually evaluated based on production, rather their performance is measured based on other traits. The detection of accrued non-productive time due to bad planning or odd jobs is important in order to be able to avoid it in the future.

An initiative, motivation and thus an opportunity to specifically, objectively and methodologically define the actual productivity of productive and optional employees are given in the following model. It deals here with the previously planned productivity.

The PI-Participation model is based on the net product of the business. The net product in relation to the model is defined as following:

If the margin of productivity for the previous year is exceeded by the production of goods in the following year, the increase in productivity is the net product.

$$\text{Productivity assessment margin} = \frac{\text{calculation time per unit} \times \text{number of units}}{\text{total time present of the planned attendance time of all direct and indirect employees}}$$

It is not the purpose of the PI-Participation model to highlight who has done more or less work, but to positively influence the results in relation to the net product using the effort asserted by the employees.

Using the PI-Participation model as innovative motivation, a distribution and assessment model with the following key points has been developed and programmed:

- Necessary leadership conduct at the implementation of the PI-Participation model
- Minimum profit of the company to be exceeded
- Arrangements for the distribution of profit for employees
- Financial involvement of employees
- Assessment of external complaints
- Internal dynamics of the continual improvement process
- Distribution assessment after accrued work costs
- Margin of net product evaluation in hours
- Attendance time of direct and indirect employees
- Net product attained in hours and percent
- Variance of net product evaluation in hours
- Dynamic, accumulated work costs in €/hour
- Potential net product in €
- Offsetting of profit or deficit payments
- Individual payment of all participating employees

2. Conduct of Leadership and Performance Goals

If necessary, opposition to the implementation of the PI-Participation model must be overcome. Opposition is manifested as a long list of demands of the system as well as arguments against its implementation, for example:

- fairness
- exactness
- no payroll deduction
- no increase in the wage bill
- simplicity
- there should always be an initiative for better performances

Since not all goals can be adhered to at the same time, the solutions will generally only be somewhat optimal. Everything else is manifested in auxiliary conditions, which more or less subordinate one another. Focus should be placed on the solution which offers the largest possible success at the time. From a business point of view this is an initiative to improve processes.

The following belong to the auxiliary conditions of the partially optimal solutions:

- recovery of inactive reserves in the target time
- promotion of employee input
- reduction of auxiliary process time based on improvements
- companies change and, along with them, participation systems
- leadership should be supported and encouraged through the participation system

With the implementation of the Pi-Participation model existing processes, which are deemed worth of modification, will be questioned continuously and with every assessment. Whether the modification processes are successful depends on how the leadership observes its responsibilities. It must make sure that the employees understand the reasons for and the significance of the planned modifications. Here it is important to sufficiently explain the starting position and the need for action.

The transparency of the planned modification is important: what should be achieved and which method should be used to quantitatively measure and assess the result?

The leadership should communicate the objectives to the employees with regards to customer orientation, productivity and cost awareness.

Evaluation points of the Productive-Investment-Participation Model

3.1. Net Product Foundation

Productivity is an essential element of performance in a company. The compensation analogous to the productivity mentioned above is therefore quite propagated in many companies.

Nevertheless, the individual key figures resulting from the assessment as well as the individual compensation assessment for each employee involved have a dynamic, unique characteristic.

Productivity is the relative relationship of input to output. The definition of the goal “10% increase in production” does not suffice. How productivity is

to be measured and which components and involvement opportunities are concerned are to be defined.

In the context of this methodological inspection, a gain in time and thus money is dealt with. However, in order to define such a profit the necessary reference base must first be defined, as is shown in fig. 1. This reference base spans the last twelve months.

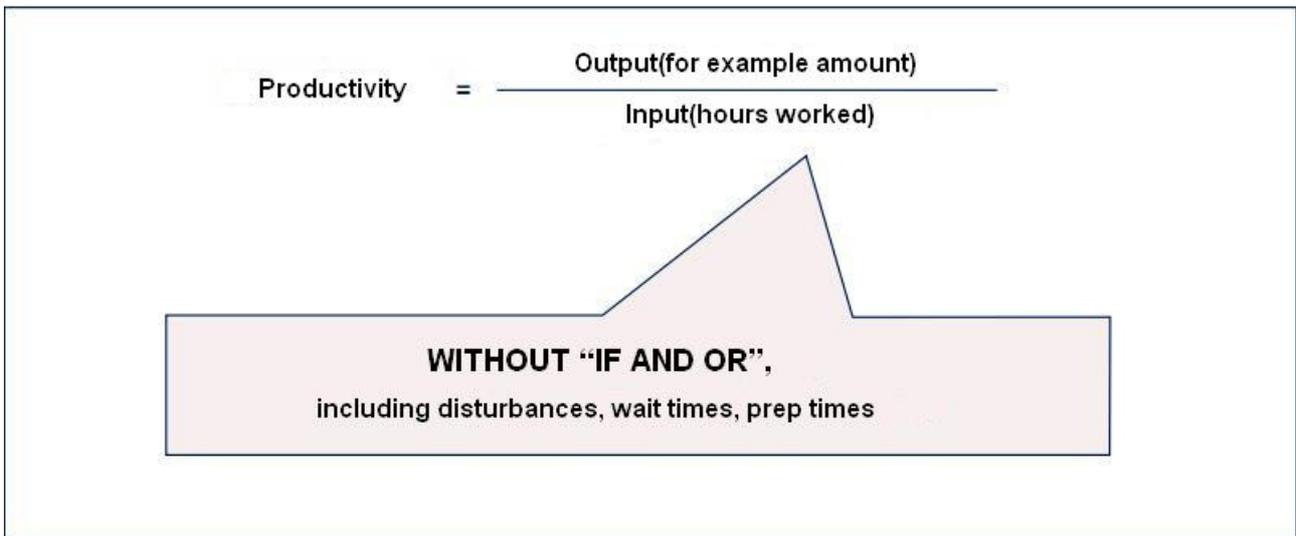


Fig. 1 Reference base productivity

The processing time or planning time, for example min./piece, hour/piece, hour/assembly etc., are reflected in the planning principles. This data should be recorded and kept at hand according to the newest working conditions. This also applies to construction stages, for example in plant construction or in the building sector. If in the context of specific stipulations the time spent at work falls short of the expected production time, time has been saved and therefore production increased. The prep times are included in the calculation here.

If planned production time and planned attendance times are present in a company with varying products and process times, the goal of a company specific reference base as a so-called margin of net product assessment or productivity assessment has been reached. Fig. 2, which follows below, shows, by way of example, the variation from month to month over the course of the year.

The time gained, which is obtained over and above the productivity assessment margin (for example more than 60%) within an accounting period, is a reference to an additional surplus in time, which was not recognizable before the implementation of the PI-Participation model

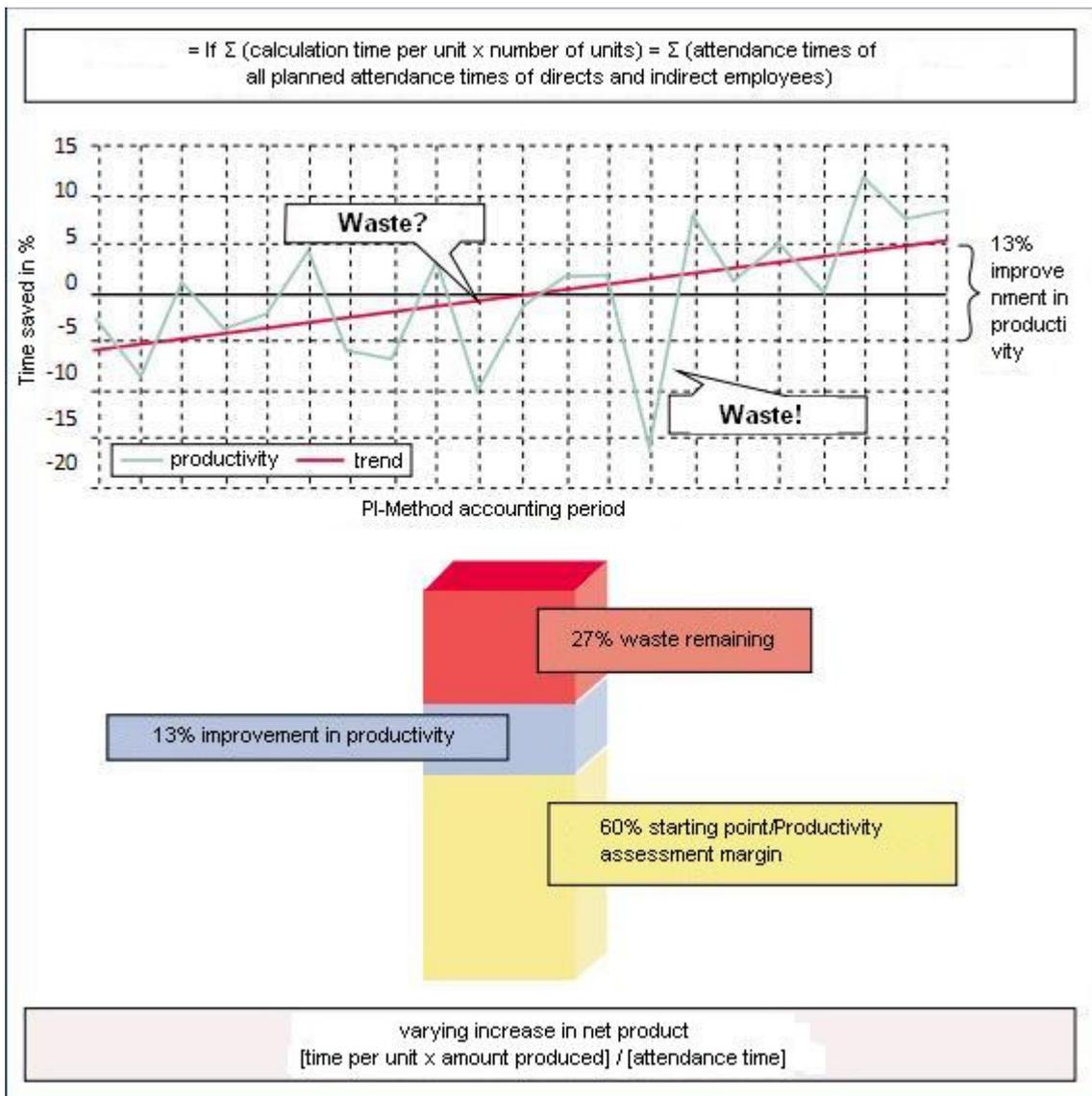


Fig. 2: Productivity description, max handling net product assessment

3.2. Costs of Involved Productive and Optional Employees

The productive employees (direct employees) are, in the context of the PI-Participation model, the workers and, if necessary, temporary employees. The group of optional employees (indirect employees) consists of, among others, those responsible for scheduling and management, foremen, assistant foremen, forklift operators, construction workers, purchasing, etc.

The work costs are made up of gross wages and salaries including the additional social costs.

The cumulative, dynamic work costs, which are used to economically evaluate the attendance time as €/hour, are included in the assessment of the net product.

Dynamic Work Costs:

periodic, cumulated work costs for all planned employees in €

periodic, cumulated attendance time for all planned employees in hours

3.3. Productive-Investment-Participation Model “The Practical Application

If the basic data described in the example are at hand the Productive-Investment-Participation model can be applied in all production companies.

The company Solar Ltd., as the general provider, is commissioned for a job with the following calculation times: sanitation 890 hours, electrical 453 hours and roofing 500 hours.

The following basic data are added as a calculation base:

Direct employees (workers, temporary workers)	13
Hours worked in hours/month	1,791 hours
Costs in €/month	57,377.05€
Indirect employees (foremen, assistant foremen etc.)	4
Hours worked in hours/month	550 hours
Costs in €/month	18,852.46€
Additional social costs	22%

Basic data for the assessment basis for the year 2008:

Calculated time spent on task	17,160 hours
Total hours worked by all employees	26,400 hours

Allocation principle:

Employer	50%
Employees	50%

Hours worked/month

Direct Employees

Employee 01	135 hours
Employee 02	126 hours
Employee 03	140 hours
Employee 04	135 hours
Employee 05	145 hours
Employee 06	135 hours
Employee 07	145 hours
Employee 08	120 hours
Employee 09	170 hours

Indirect Employees

Employee 01	140 hours
Employee 02	145 hours
Employee 03	145 hours
Employee 04	120 hours
Total	550 hours

Employee 10	160 hours
Employee 11	120 hours
Employee 12	140 hours
Employee 13	120 hours
Total	1,179 hours

Net product assessment margin for the year 2008

Time spent on task	<u>17,160 hours</u>	x 100% = 65%
Hours worked	26,400 hours	

Work hours to be calculated

Direct hours	1,179 hours
Indirect hours	550 hours
Total hours worked	2,341 hours

Net product achieved in %

$$(1,843 \text{ hours} / 2,341 \text{ hours}) \times 100\% = 78.73\%$$

Net product assessment margin in hours

$$\frac{65\% \times 2,341 \text{ hours}}{100\%} = 1,521.65 \text{ hours}$$

Absolute employee productivity in %

$$78.3\% - 65.00\% = 13.73\%$$

Relative employee productivity in %

$$\frac{1,843 \text{ hours} \times 100\%}{1,521.65 \text{ hours}} = \mathbf{121.12\%}$$

With a performance of 121.12%, a result-oriented net product of 13% is achieved.

Deviation from the net product assessment margin in hours

$$13.73\% \text{ of } 2,341 = \mathbf{321.42 \text{ hours}}$$

Additional social cost 22%

$$\text{Work costs for direct employees } \mathbf{57,377.05} + 22\% = \mathbf{70,000.00\text{€}}$$

$$\text{Work costs for indirect employees } \mathbf{18,852.46} + 22\% = \mathbf{23,000.00\text{€}}$$

$$\frac{70,000\text{€} + 23,000\text{€}}{2,341 \text{ hours}} = \mathbf{39.73\text{€/hour}}$$

Potential net product expenditures

321.42 hours x 39.73 €/hour = **12,770.02 €**

Allocation of net product for company/employees in this case

Employees: 50% = **6,385€**

Company: 50% = **6,385€**

Implementation principle – more input results in more output:

Key for the allocation separation for direct and indirect employees

Direct an indirect allocation shares

Direct = $70,000 \text{ €} / (70,000 \text{ €} + 23,000 \text{ €})$
= $70,000 \text{ €} / 93,000 \text{ €}$
= $0.7527 \times 100 \%$ = **75.27 %** for direct employees

Indirect = $23,000 \text{ €} / (70,000 \text{ €} + 23,000 \text{ €})$
= $23,000 \text{ €} / 93,000 \text{ €}$
= $0.2473 \times 100 \%$ = **24.73 %** for indirect employees

Net product allotment expenditures

Net product in € for direct employees

75.27 % of 6,385 € = **4,806 €** for direct employees

Net product in € for indirect employees

24.73 % of 6,385 € = **1,579 €** for indirect employees

Individual wages for planned employees

The respective achieved net product is allocated to the direct and indirect employees based on hours worked per month:

$$\frac{\text{hours worked per month/employee}}{\text{sum of employee hours worked}} \times \text{total net product}$$

Direct employees:				Indirect employees:			
Total share of net product:		4,806€		Total share of net product:		1,579€	
Total hours worked:		1,791 hours		Total hours worked:		550 hours	
Empl-oyee	Hours/ Month	Share in %	Share in €	Empl-oyee	Hours/ Month	Share in %	Share in €
Empl 01	135 hr	7.54%	362.26€	Empl 01	140 hr	25.45%	401.93€
Empl 02	126hr	7.04%	388.01€	Empl 02	145 hr	26.36%	416.28€
Empl 03	140hr	7.82%	375.68€	Empl 03	145 hr	26.36%	416.28€
Empl 04	135hr	7.54%	362.26€	Empl 04	120 hr	21.82%	344.51€
Empl 05	145hr	8.10%	389.10€	Total	550 hr	100.00%	1,579.00€
Empl 06	135hr	7.54%	362.26€				
Empl 07	145hr	8.10%	389.10€				
Empl 08	120hr	6.70%	322.01€				
Empl 09	170hr	9.49%	456.18€				
Empl 10	160hr	8.93%	429.34€				
Empl 11	120hr	6.70%	322.01€				
Empl 12	140hr	7.82%	375.68€				
Empl 13	120hr	6.70%	322.01€				
Total	1,791 hr	100.00%	4,806.00 €				

All results, including further key figures, can be calculated quite easily with the help of a tool.

Fig. 3 shows the mode of action of all interim and final results.

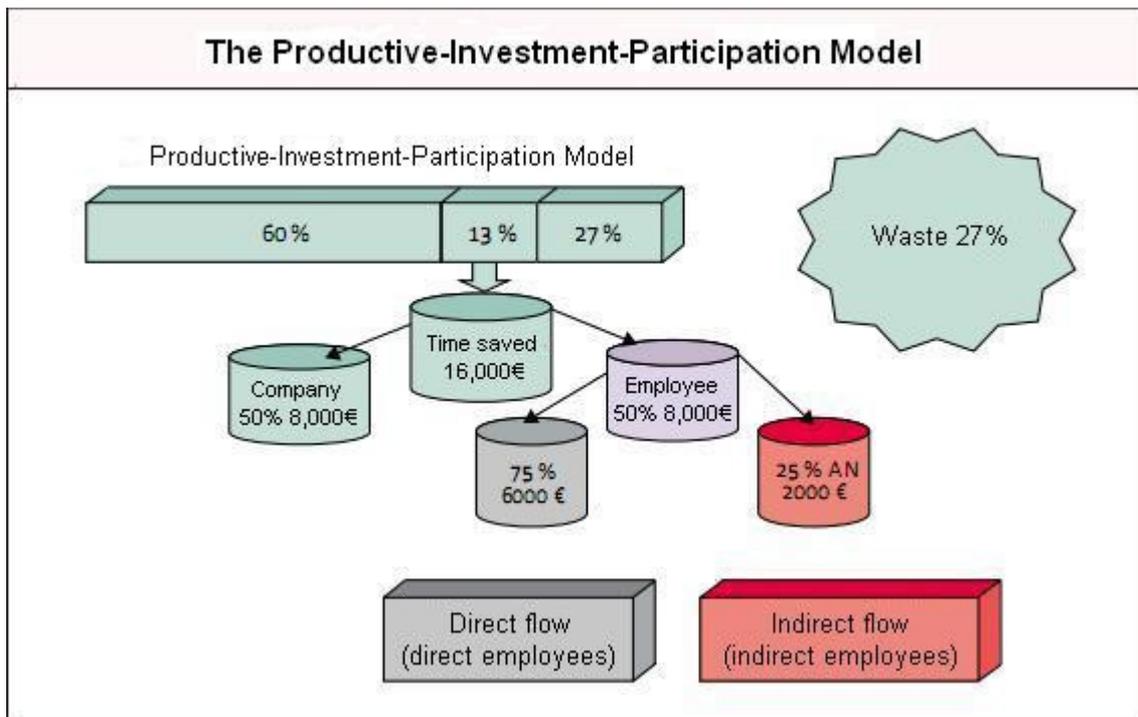


Fig. 3 Methodological mode of operation of the PI-Participation model

3.4 Practical Handling of retrospective complaint costs

Productivity correlates only to products, wares etc., which meet the required quality standards. With the help of the PI-Participation model the sum of manufactured wares is multiplied by the corresponding processing time per unit, which is understood as economic production time. If retrospective customer complaints are determined, the already distributed net product will be offset in the next accounting period as follows:

Example: 10,000€ in external complaint costs

39.73 hours of work costs including additional social costs

The goal here is to assess the costs in hours. If one uses the above mentioned parameters as a basis, the result is:

$$10,000\text{€}/39.73\text{€ per hour} = 251.70 \text{ complaint hours}$$

The consequential costs resulting from complaint processing play a deciding role here. Additional work resulting from complaint processing is not counted as productivity, since an allotment of profits has already taken place in the past months. If only wares were produced, the above mentioned consequential costs would not arise.

3.5 Allotment of net product

How the net product is distributed between the company and the involved employees will be established here. The allotment should be established and

planned by the company and the personnel.

The allotment of the achieved improvement in net product between the company and the employees does not always have to occur at a 50:50 ratio. Fig. 4, which follows, shows further practised possibilities of a goal and net product oriented payout for employees and the respective company.

Absolute net product	Company	Employee target agreement
> 0% ≤ 5 %	50 %	50 %
> 5% ≤ 8 %	45 %	55 %
> 8% ≤ 10 %	35 %	65 %
> 10 %	30 %	70 %

Fig. 4 Allotment to the advantage of the employees: “the higher the net product, the higher the payout for the employees”

This distribution pattern is also applied in the assessment of external complain costs as follows: the 251.70 complaint hours are evaluated according to the designated distribution principle of 50:50. In relation to this distribution principle the complaint costs – 252.70 hours - are deducted from economic production hours so far and once more compared to the sum of all hours worked using the same algorithm.

Analogous to the practical implementation this means:

Period-related production hours to be calculated:	
period-related production hours	$= \frac{\text{retrospective complaint costs in €}}{\text{period-related work costs in €/hour}}$
1,843 hours	$= \frac{10,000\text{€}}{39.73\text{€/hour}}$
1,843 hours	$= 251.70 \text{ hours}$
Result:	
According to the results, 1,591.30 production hours – instead of 1,843 production hours - will become effective for the revised productivity evaluation.	

Subsequently, a further division according to the cost submission principle will be carried out in the relationship of the productive and optional work costs to the total costs as the input-cost-factor.

3.6 Hours worked for the participating direct and indirect employees

All hours worked are usually recorded daily using the employee time registration system(ETR) for the present direct and indirect employees with

employee and cost centre data, and can, when needed, be entered as the sum of hours worked per accounting period in the Excel interface of the programmed PI-Participation model.

3.6.1 Input data

The required input data will be described in this section.

For the net product in % (section 3.1):

- Work costs(gross wages) for direct(productive and indirect(optional) employees per accounting period (section 3.2)
- Additional social cost in % (section 3.3)
- Profit distribution variant for employees in % (section 3.3)
- Sum of hours worked for direct employees per accounting period

For the assessment of work costs in €/hour (section 3.3)

- Sum of hours worked for indirect employees per accounting period

All necessary output data, including individual compensation for every involved and available employee, are generated as follows using these input data.

3.2.6 Output data on company data collection (CDC) and employee time registration (ETR)

The production data by time and amount, as well as hours worked, can be connected, using the CDC and ETR respectively, with PI-Participation model with the use of an additional interface program.

In the same way as the input data, all following output data can be automatically calculated as follows:

- Hours worked by direct employees per accounting period
- Hours worked by indirect employees per accounting period
- Indirect and direct allotment assessment of work costs to to the total work costs of all planned employees per accounting period
- Net product assessment margin in hours per accounting period
- Achieved net product in hours per accounting period
- Net product assessment deviation in hours per accounting period
- Achieved net product in % per accounting period
- Absolute and result-oriented employee productivity in % per accounting period
- Relative employee productivity in % per accounting period
- Dynamic work costs in €/hour per accounting period
- Potential net product in € per accounting period

- Allocation of (profit/loss) in € per accounting period
- Complaint costs in %

3.7 Profit/loss per accounting period

If the result within an accounting period is ever – for whatever reasons – less than the basic net product, the payout will be set to zero and the value in € will be partially added to a deficit account to be offset in the next accounting period. As soon as the account has a surplus in the next accounting period, the next individual payout will occur.

Fig. 5 presents the potential net product in percent.

Overview of savings without payment of employees					
Work costs	30.00€/hour				
Hours per year	1500 hours				
Savings in %	1.0%	2.0%	3.0%	4.0%	5.0%
Number of direct and indirect employees planned	Savings in €/year				
50.00	22,500.00	45,000.00	67,500.00	90,000.00	112,500.00
100.00	45,000.00	90,000.00	135,000.00	180,000.00	225,000.00
150.00	67,500.00	135,000.00	202,500.00	270,000.00	337,500.00
200.00	90,000.00	180,000.00	270,000.00	360,000.00	450,000.00

Fig. 5: Productive hours have been made out of previously unproductive working hours. Assessment of all hours worked at 30€/hour in this example.

Further output data:

- Net product in € for direct employees per accounting period
- Net product in € for indirect employees per accounting period
- Individual proportion of hours worked for direct employees in %
- Individual proportion of hours worked for indirect employees in %
- Individual compensation per accounting period for direct employees in €
- Individual compensation per accounting period for indirect employees in €
- Economic, participation-oriented hourly wage in €/hour per accounting period according to:
 - > Weighted participation in €/hour for direct and indirect employees

4 Advantages of and uses for the PI-Participation model

Besides the possible savings (see fig. 5), there are other advantages for a company which arise from the implementation of the PI-Participation model.

- All planned employees in the company will be exclusively involved in the production and net product results. This means that subjective criteria need not play a role.
- Fundamentally, the wages for employees will be taken from one profit gained in the production process
- All participating employees, direct as well as all planned indirect employees will be incorporated.
- All employees strive to reach the production result with as few work hours and downtime as possible.
- Common motivational dynamics and acceleration are developed due to a continuous improvement process.
- The employees will sensitised for any and all forms of unnecessary costs.
- The company always influences the production result through employee acquisition and/or dismissal in the context of the PI-Participation model. These production results are shown through permanently varying, and thus dynamic, work costs in €/hour.
- Losses must be translated into profits.

5 Comments and references

Before the PI-Participation model is implemented these basic questions should be answered.

- What is the existing net product?
- Which net product potentials can be developed?
- Which direct and indirect employees should be involved?
- Are the work costs for the direct and indirect employees present?
- How high are the additional social costs for the planned employees?
- Do the present processing, calculated or target times correspond to the current working conditions?
- Should the data for production and hours worked be processed manually or by machine in the PI-Participation model?
- Is the production based on contract and/or stock?
- Which goal and net product-oriented profit distribution is logical?
- Is the maintenance of the system secured long-term?

The PI-Participation model described here is an assist to achieve continual improvements. It deals with a direct measurement from accounting period to accounting period of the turnover of the finished product in relation to the time invested by the employees. The stipulations are based upon the results.

The net product basis can be fostered in the results of the continual improvement procedure based on working conditions and through a functioning work and time industry using adapted processing, calculation or target times. Acquisition and loss of employees brings minimal change to the work cost calculation rate.

Address of the Author

Klaus Westerhoff

Westerhoff . Beratung . Coaching

BVBB- und BUB-Partner

Im Tannet 18

93483 Pöding

Telefon: 0173/29 58 163

E-Mail: Westerhoff-Klaus@web.de

www.PI-Methode.de