

S2B Hub Presentation

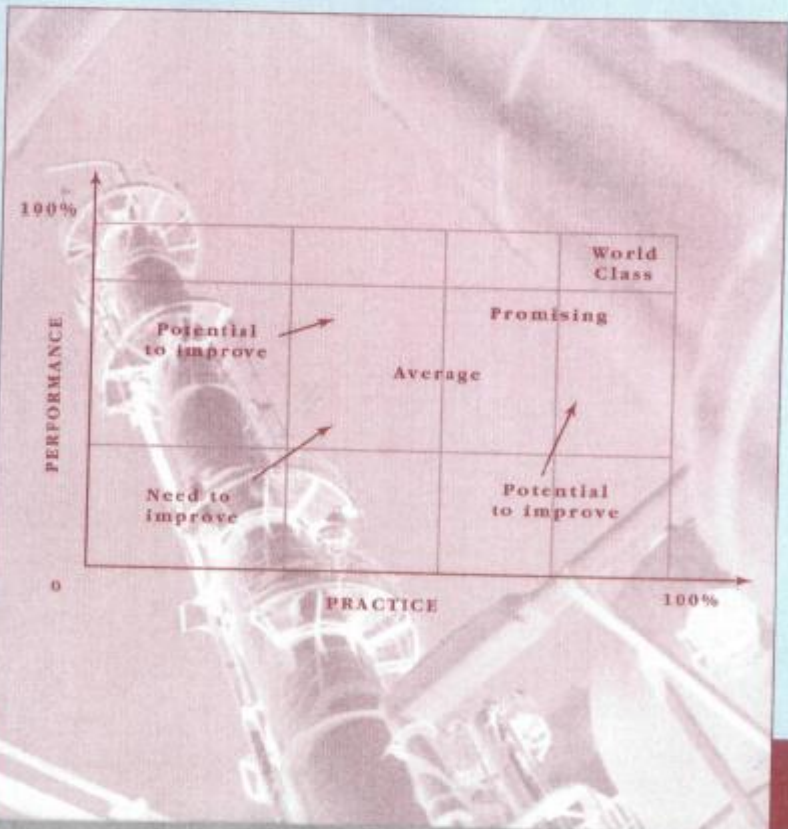


Benchmarking

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BENCHMARKING IN THE PROCESS INDUSTRIES

Munir Ahmad • Roger Benson



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The first step to improving performance and competitiveness of a plant is to benchmark against the best in the world. *Benchmarking in the Process Industries*, based on the authors' experience of over 200 process plants, describes how to measure and set standards in manufacturing performance.

The authors argue that:

- output can be increased by 30%;
- stocks reduced by 50%;
- fixed costs reduced by 20%;
- variable costs reduced by 10%.

All this can be achieved with minimum to zero capital expenditure.

Improving manufacturing performance is the next big opportunity for the rapidly changing world of chemical processes. This book provides the framework, measures and industry world-class targets to allow your company to maximize its potential. It is essential reading for existing and aspiring managers in the process industries.

IChem^E

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ISBN 0-85295-411-5



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Roger Benson is Chief Engineer at ICI Manufacturing Technology where his responsibilities include benchmarking and assessment. He is also a Visiting Professor to Imperial College, University of Newcastle and the University of Teesside. In 1995, he completed a two-year period with the Innovation Unit of the DTI. During this period, Roger was Process Sector Programme Manager for the Innovative Manufacturing Initiative. For six years, he has been a judge for the UK Best Factory Award.

Presentation outline

- Benchmarking Definition & Types
- The benchmarking methodology
- Key performance indicators
- World class performance of process plants
- Practice – performance relationship
- Process plant case study
- The process plant's operational effectiveness

Definition of Benchmarking

Comparing business processes, not only performance measures

A structured process

‘ Benchmarking is the process of continuously measuring and comparing one’s business performance against comparable processes in leading organisations to obtain information that will help the organisation identify and implement improvements’

External Focus

Improvement not evaluation

Learn from others

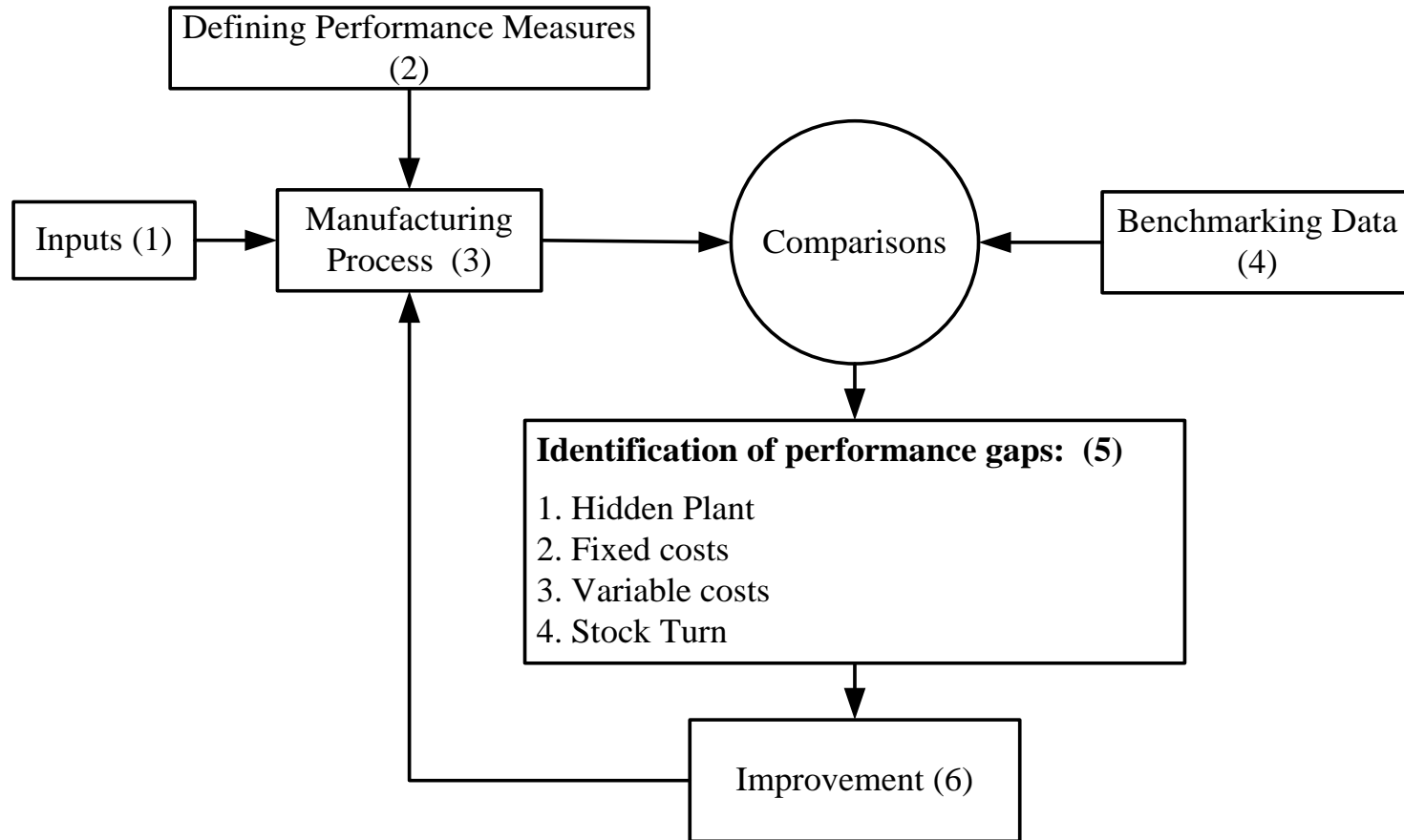
Types of Benchmarking

- ***Internal benchmarking:*** It is about comparing internal operations from one sister company to another.
- ***Competitive benchmarking:*** this specifically compares competitor to competitor, using the product or function of interest.
- ***Functional benchmarking:*** this is the comparison of similar functions within the same broad industry, using wide industry leaders as partners.
- ***Generic benchmarking:*** this involves establishing the comparison of business functions or processes that are the same, regardless of type of industry.

Why benchmarking?

- It has been quite common to determine in companies during the first benchmarking exercise that;
 - Hidden plant > 30% of output,
 - stocks may be reduced by 50%,
 - the fixed cost can be reduced by anything up to 20%,
 - potential variable cost reduction by a further 10% and customer service is poor.

The Process Plant's Benchmarking Methodology



Key performance indicators (1/3)

- **Customer services**
 - On Time In Full (OTIF)
 - Customer complaints.
 - Due date reliability.
 - Adherence to production plan
 - Stock turn.

Key performance indicators (2/3)

- **Reliable assets**
 - Product rate
 - Quality rate
 - Availability
- **Operational excellence**
 - Statistical process control
 - Manufacturing velocity

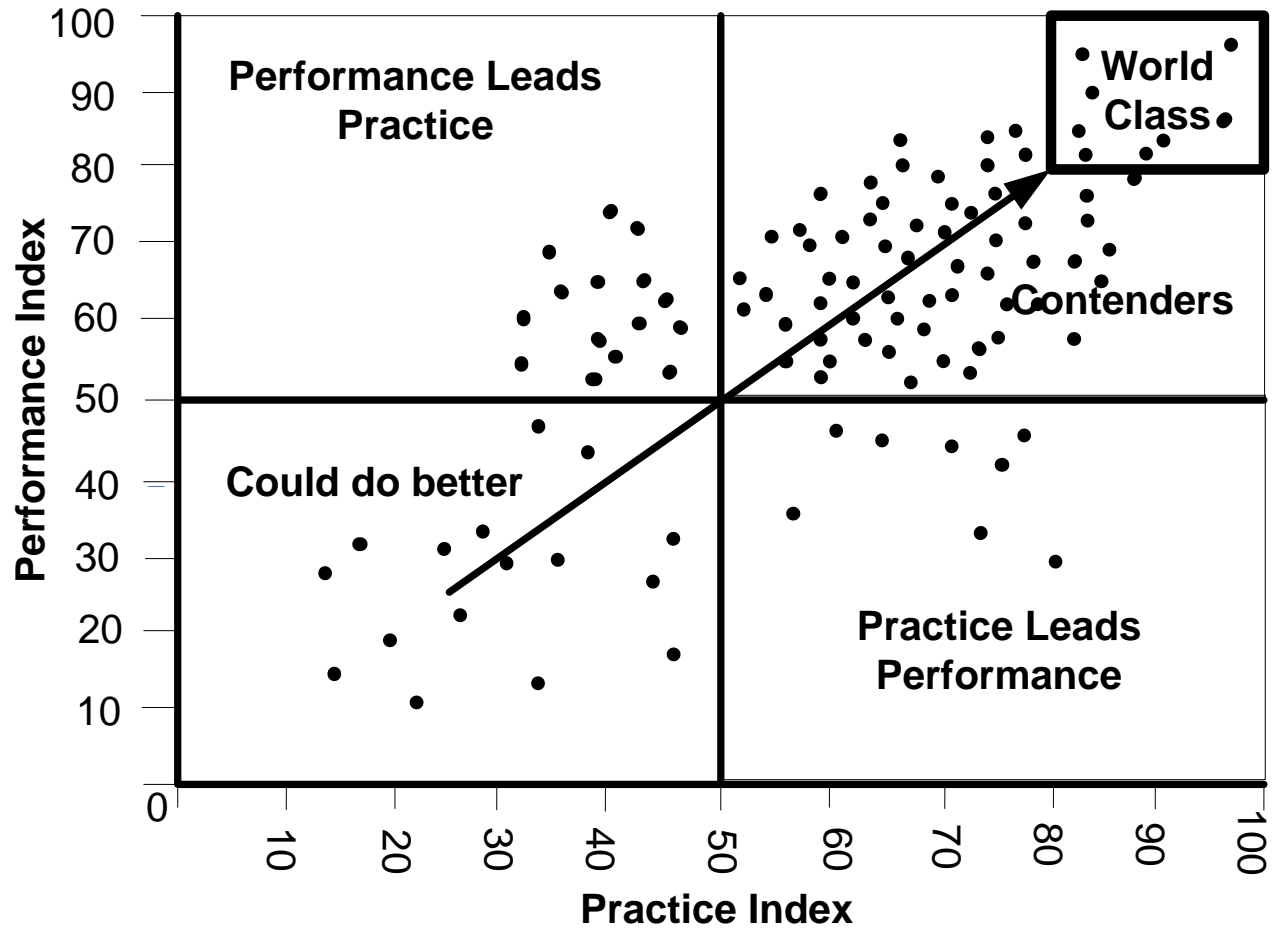
Key performance indicators (3/3)

- **Motivated people**
 - Absenteeism
 - Training days
 - Staff turn over
- **Safety, health and environment**
 - Annual reportable injury accidents
 - Environmental performance

World-Class Performance of Process Plants

No.	Key Performance Indicator	World Class Performance
1	Adherence to Production Plan	> 99 %
2	Overall Equipment effectiveness (OEE)	> 95 % for continuous plants > 85 % for batch plants
3	Process Capability (CpK)	> 2
4	On Time In Full (OTIF)	> 99.9 %
5	Stock Turn	> 25
6	Value Added per Manufacturing Employee	£400K
7	Training Days per Employee	12 days
8	Absenteeism	< 1 %

Practice - performance relationship



Process Plant Performance (1/2)

Performance measure	Actual Performance	World-Class
Manufacturing Added Value/Employee		
3.1 Manufacturing Added Value per Manufacturing Employee for the plant	£36K	£400K
Customer Service		
3.2 OTIF Delivery performance %	70 %	99.9 %
3.3 Adherence to production plan %	60 %	> 99.9 %
3.4 Customer complaints % of orders delivered	15 %	< 0.01
Reliability and Consistency		
3.5 Product rate %	65 %	90 %
3.6 Quality rate %	95 %	99 %
3.7 Do you routinely measure lost time		
Scheduled downtime - % of capacity		
Unscheduled downtime - % of capacity		
Availability is 100% less the sum of scheduled and unscheduled downtime	90 %	95 %
Calculated OEE	56 %	85 %

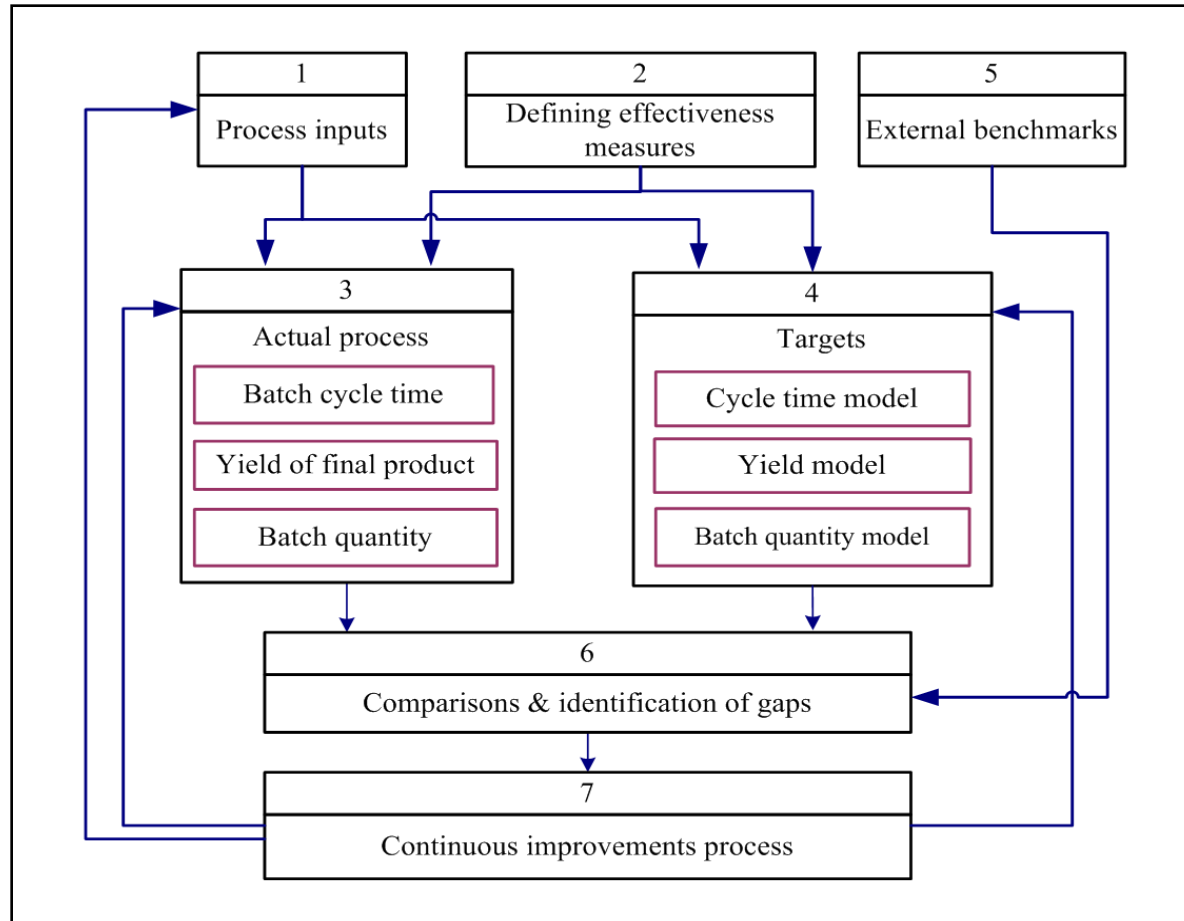
Process Plant Performance (2/2)

3.8 Maintenance cost as % of replacement asset value		
Control Flexibility		
3.9 Process Capability (CpK)		> 2
3.10 Change time of routine tasks affecting production, including grade changes (in minutes)	60 minutes	
Stocks		
3.11 Value of material and source stocks		
Value of work in progress		
Value of engineering spares & stores items		
Value of finished goods stocks		
Total value of stocks		
Stock turn	0.00005	> 25
People		
3.12 Absenteeism %	4 %	< 1 %
Safety: All injury frequency rate		
Environmental performance		
Average training days per employee	4	13
Total Score	24	> 81

Performance Index

0 - 20	The plant manufacturing has considerable scope for improvement. The plant requires a detailed operational excellence assessment, with a high likelihood of significant benefits through manufacturing, maintenance, and operational changes.
Division 1: Poor	
21 -40	The plant manufacturing performance has scope for improvement. A detailed analysis of the operational and maintenance excellence is required to assess the potential improvements.
Division 2: Below Average	
41 -60	The plant appears to have manufacturing and maintenance practices which, while average, could be improved. The assessment has highlighted some areas of the plant with further potential.
Division 3: Average	
61 - 80	The plant has good manufacturing and maintenance practices and it appears to be exploiting learning opportunities.
Division 4: Good	
81 -100	The site is aware of the scope for further maintenance and manufacturing improvement. The plant is approaching a winning standard and demonstrating leading manufacturing and maintenance practices.
Premier Division: Winning	

The process plant's operational effectiveness



Conclusion (1/2)

- The methodology used in this presentation suggested that there will be a significant opportunity to improve the performance of the majority of the existing assets.
- Through benchmarking, gaps are identified and an outline of a procedure to quantify existing gaps was provided.
- All the tools provided by the methodology of benchmarking within the process plants focus on quantifying a financial gap; this sets out the priorities and justifies the case for continuous improvement. After identifying the gaps, guidelines were given for companies on how to introduce process improvements which are realistic and achievable.

Conclusion (2/2)

- The presentation has also investigated the techniques that used to define performance targets to assist manufacturing plants in attaining their goals. No one target setting method is enough in itself as the competition may have deployed better equipment, technologies or innovations to generate high performance results. Therefore, it is advisable to use the different target-setting methods in conjunction, as none of these methods are adequate, individually, for determining performance targets.
- The results of application at the selected case study plant revealed that there are significant losses on time and money. The improvement in the time of the process will lead to an increase in the value of the product, thus creating financial savings.

Thank You

