The Worldwide Search for Best Practices by Benchmarking Programmes of the Water Sector

Filip Bertzbach and Torsten Franz (Hamburg/Germany)

Benchmarking is a management tool which is well-established in the water sector since its first occurrence in the early 1990s. Worldwide hundreds of initiatives, programmes and projects can be counted. Some of them are listed in this article to explain the current status of practice. The long term use has neither led to a consistent terminology on benchmarking nor to a consistent practice. Nonetheless, the goals connected with benchmarking in the different programmes can unanimously be described with performance assessment, performance improvement and also public communication. But not all programmes have the same focus. It must be made clear, that when speaking about a management tool facilitating learning and improvement (mostly found in industry-based approaches) and when speaking about a tool to increase transparency and governance, the two rationales are very different.

The authors of this article work for the German industry-based approach of benchmarking. Their understanding is confronted with the appliance of benchmarking in other programmes. Hereby, the success factors of benchmarking as a tool to discover good practices are shown. The industry-based approach of benchmarking has started on a national level, but soon was transferred also across the borders. An invitation of German operators to European operators is given to work with such methods on an international level.

1 Introduction – Wide Variety of Benchmarking Programmes in the Water Sector since the 90s

Benchmarking is a management method that has spread throughout a wide array of sectors since the late 1980s. Credit for the description of the idea and concept of benchmarking is mainly given to two American publications [1, 2]. In both cases benchmarking is seen as a tool to identify best practices used by partners or competitors. The method has been promoted since then. A recent publication [3] counts on average 350 publications each year between the period 1993 to 2004 and cites studies from 2009 in which benchmarking is ranked by 9,000 managers as the most-used management tool. A survey [3] among 450 organisations predicts that it will also continue to be the most-used tool in the future.

In the water sector the first benchmarking projects started in the early and mid-1990s [4]. Today, the sector has ample experience in benchmarking. A review (International Benchmarking Review by WRc, in [5]) identified about 160 benchmarking initiatives in the global water sector in 2001[1]. Programmes and activities are differentiated as follows:

- ***National industry-based programmes*** are initiated by the water operators or industry themselves and are run voluntarily and organised by industry associations, consultants or operators (or through a cooperation among these parties). Such programmes exist in most European Countries, Canada and Australia but also in newly industrialised and developing countries. Leading programmes are selected for this article:
  - aquabench GmbH in Germany was founded in 2003 by German and Swiss operators (*www.aquabench.de*). It is the biggest consultant for benchmarking programmes in the German water sector and represents experiences which operator have made with benchmarking since 1996. German benchmarking programmes are run on base of defined understanding of benchmarking by technical rules of the industry associations [6].
  - National Water & Wastewater Benchmarking Initiative (NWBBI) in Canada is an initiative of operators, run by a consultant in close cooperation with operators. It has a strong history in developing learning and improvement tools.
  - The South African Local Government Association (SALGA) runs a programme for all municipalities in South Africa (Municipal Benchmarking Initiative) and is a successful example of an industry-based approach in developing countries.[2]

[1] [5] provides a general overview of activities for Latin America, Africa, Asia and OECD countries based on a study for the World Bank. [7] compares the work of 18 regulatory agencies from developed and developing countries. For Europe [30] has given recently a rough overview of some benchmarking activities in European countries (which nonetheless is far from complete).

[2] Additional programmes from developing countries, initiated by industry associations, are known to the authors from Kenia and Arab countries.

- ***Regulatory benchmarking programmes*** are initiated by regulatory authorities to assess and improve quality of service or to support economic regulation. Such programmes are mandatory. [7] concludes in a survey of regulatory practice, that 95 % of regulators use performance indicators for assessment, often described as "benchmarking". Relevant examples to describe such practices are:
  - Ofwat, the water services regulation authority for England and Wales is considered by some authors to be one of the first institutions to introduce assessment by performance indicators in the water sector [8]. The regulator has a strong history in different and varying applications of benchmarking.
  - Mandatory benchmarking in the Dutch water sector is an example of collaboration between operators and ministry entities. The operators had been conducting voluntary benchmarking since 1997, however, since the Dutch Water Act in 2010 utilities have to participate in mandatory benchmarking which is partly based on the voluntary programme; these results are published [9].
  - ERSAR, the regulating authority for water services and waste disposal in Portugal, has been using performance indicators to formulate and assess water sector objectives since 2004.
- ***International associations and organisations*** summarize and support benchmarking programmes:
  - In 1997, the International Water Association (IWA) established a PI taskforce. Its final output, the IWA PI systems for water supply services [8] and for wastewater services are likely to be the most widely used references in their field today. Among many other applications, these systems are the basis for the regulatory PI system of ADERASA in South America, the framework for voluntary benchmarking of water supply in Germany, the quality of service regulatory system established in Portugal, the Japanese PI system of the Japanese Water Works Association, and the water losses PI of the American Water Works Association [8]. The conference series from the IWA Specialist Group on Benchmarking and Performance Assessment summarises international experiences and developments since 2008 [10]. Relevant IWA publications summarise worldwide trends [8, 11].
  - [12] summarises sources on international activities in the water sector and provides data of more than 135 countries and more than 4,400 operators.
  - ISO Technical Committee 224 published a series of standards on objectives and performance assessment of water services, among others using performance indicators [13]. Currently, the Committee is also working on a standard for benchmarking in water services.
- Additionally, **international benchmarking programmes,** initiated by operators and the industry, have been started in recent years (see chapter 4).

This article compares the different focus of the practical programmes, by showing that all programmes are focusing on per-

formance assessment, performance improvement and public information, but using very different tools to reach these goals and having a very different understanding of benchmarking. Tools and success factors to reach performance improvement in industry-based programmes are summarized and an invitation to participate in international activities of such programmes is given.

2 Differences in the Understanding and Practices of Benchmarking

2.1 Theoretical Concepts

Authors of the International Water Association rightfully point out that nearly 20 years of activities in benchmarking and subsequent publications have led to a "sometimes confusing terminology" on benchmarking and its various concepts [8, 14]. This is primarily attributed to the fact that different academics, consultants, and regulators employ different terminology to classify benchmarking methods. In particular, the difference between metric benchmarking and process benchmarking was never unanimously understood in the various publications, leading to variations in language on benchmarking methods[3]. In fact, the theoretical discussion regarding terminology reflects real differences in the practice of benchmarking. One particular feature can be identified across all industries:

"One of the common problems is that many people consider benchmarking to be solely about comparison rather than learning from the practices of other organisations and adapting and implementing these practices." [3].

"Metric benchmarking" is often associated with the comparison of measurements and results, whereas "process benchmarking" is considered to relate to "adaption of best practices" and "learning" (in some understanding even without considering metric, or quantifiable, measures.). In this sense, such classifications correctly encompass existing methods. However, such distinctions seldom exist in reality – most process benchmarking rely on the use of indicators (metrics) and the application of metrics in metric benchmarking is often aimed towards improvement.

The IWA Specialist Group on Benchmarking and Performance Assessment recommends abandoning the above classifications and propose a simpler concept of benchmarking methods [14]:

"Benchmarking is a tool for performance improvement through systematic search and adaptation of leading practices."

When summarising the discussion on metric and process benchmarking, they conclude:

"The IWA Specialist Group on Benchmarking strongly recommends abandoning the use of the terms 'metric benchmarking' and 'process benchmarking'. Instead "performance assessment" and "performance improvement" should be considered consecutive components of benchmarking."

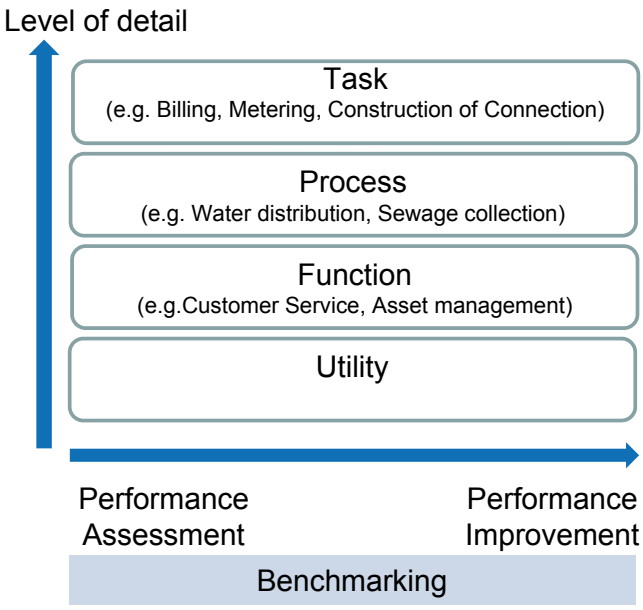


Fig. 1: Performance assessment and improvement model [14]

The German associations have worked in the same direction, when formulating technical rules on benchmarking [6].

To illustrate this understanding a "performance assessment and improvement model" was developed (Figure 1). The IWA model [14] clearly points out that the performance improvement is essential in benchmarking. All programmes should reflect how performance improvement is achieved through the use of their methodology. But the model also helps understand and classify existing methods and programmes. The above mentioned metric benchmarking is focused mainly on "performance assessment" and "at the utility level". Process benchmarking has stronger focus on "performance improvement" at the process level.

Most benchmarking programmes are ultimately used to improve the sector, so although the main focus of their work and activities is on performance assessment, the model should not be used to deny the programmes the "title" of benchmarking. In fact, differences can be rather discerned differentiated by the practice of programmes, whether programmes are just "assuming" that results are used for improvement processes or if they truly "facilitating" the improvement process (see next chapter).

2.2 Differences in the Focus of Industry-Based and Regulatory Programmes

The IWA model can be used to describe the different focuses of benchmarking programmes in the global water sector on "performance assessment" and "performance improvement". However, this article adds an additional area of interest to the model which has been identified among all programmes compared – the focus on transparency.

In simple terms, regulatory/mandatory and industry-based/voluntary programmes can be distinguished according to these

[3] [5] in a study for the World Bank and also [12] are using such terminology (additionally, advanced statistical methods, described as „performance benchmarking" and „engineering-model company" and „customer survey benchmarking are described by these authors and institutions as benchmarking categories).

three focus areas. Industry-based approaches tend to focus on tools for performance improvement through learning and the search for best practices by best practice workshops, by the documenting of action plans or conducting more detailed benchmarking at process or task level [15, 16]. The tools are described in more detail in chapter 3.

Whereas "Benchmarking" in mandatory programmes is often mainly understood as an activity of assessment and publication of performance [17], these programmes do not count with tools to facilitate performance improvement. Even if additional improvement plans are requested by the government, as in the case in the Netherlands, no tools of learning and of exchanging are provided (Table 2). Instead, it is expected that improvement will be incentivised by publishing of the results.

Additionally, regulators are rewarding and penalizing performance, sometimes based on the benchmarking results or through comparison of PI values, e. g. Ofwat, UK. Sophisticated econometrical models that evaluate costs (for tariff-setting) considered to be benchmarking by the British regulator. The results are used for tariff-setting and may incentivise economic improvement. Additionally, Ofwat is using a so-called Service Incentive Mechanism when setting price caps (a comparative index based on number of complaints and customer evaluation). Another example of an incentive based on benchmarking results is exemplified by ERSAR, Portugal. The best performing operators based on the data collected, audited and managed by ERSAR are publically acknowledged and rewarded in a ceremony.

Giving benchmarking activities in regulatory context a clear function and place may be tricky as it is sometimes difficult to distinguish between the benchmarking tools and other tools used by the regulator. Therefore, additional activities for performance assessment, performance improvement or transparency need to be taken into consideration to understand the logic of the respective regulatory programme, such as:

- Different reporting activities (which are not necessarily called benchmarking):
  - Ofwat publishes a comparative performance assessment of utilities on its homepage and asks utilities to do so individually.
  - ERSAR has developed a mobile device to inform citizens.
- ERSAR works on best practice promotion and workshops, although not necessarily in connection with benchmarking.

Similarly, publication activities are not always considered to be part of the benchmarking exercise by the industry-based programmes, they are, nonetheless, often at least connected to most programmes.

Finally, it must be stressed that voluntary and industry-based approaches to "benchmarking" or "performance assessment" might cooperate or "co-exist" in one country. Such is the case in South-Africa, where the voluntary MBI-Initiative partly builds on mandatory data from the regulator, or in the Netherlands, where the mandatory programme is held every three years in addition to annual voluntary benchmarking, and

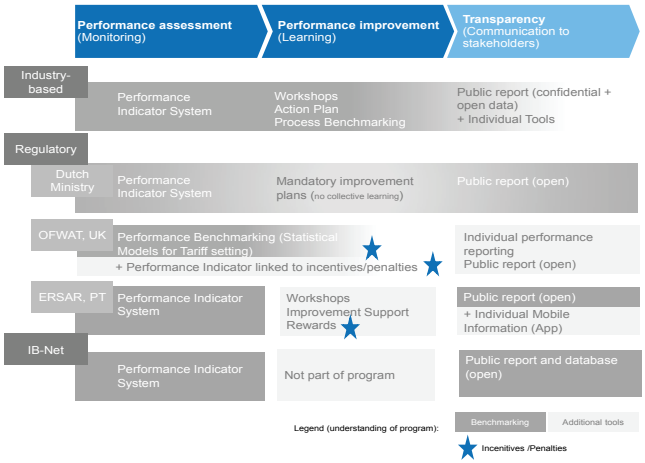


Fig. 2: Scope of benchmarking in chosen different programmes

Fig. 3: App from the Portuguese Regulator (ERSAR) providing key information on each municipality [19]

in the UK, where utilities participate in the voluntary European Benchmarking Co-operation.

2.3 Benchmarking for Learning and Public Information – two different rationales

"Transparency" and the way information is made publically available, is the other main focus (besides performance improvement) where programmes show discrepancies (see Figure 2). Again, a line can be drawn between regulatory programmes, where information is deliberately published to inform sector stakeholders and make the industry "accountable", and industry–based programmes, where public information is rather a consequential and additional goal of programmes. The regulatory programmes (Ofwat, ERSAR, Dutch Ministry) and IBNET openly communicate the results of each utility, hereby not all activities of transparency are necessarily called "benchmarking" (see Figure 2). [7] describes this widely used regulatory practice as "sunshine regulation", where operator's performance is compared, and publicly disclosed and ideally discussed to exert public pressure on those with poor levels of performance:

- Ofwat asks regulated companies to annually report on a set of performance indicators to ensure companies are *"accountable and responsive to their customers' expectations"* [18]. The recommended set of indicators is chosen to *"be a useful tool for customers, regulators, investors and other stakeholders to formulate an understanding of a company's performance"* [18]. The main part of reporting is done by utilities themselves; additionally Ofwat publishes a small set of indicators on its homepage.
- ERSAR has developed a mobile device application to inform customers. It includes information on a set of performance indicators and the relative performance of these indicators in comparison to the sector in Portugal [19] (Figure 3).
- The Dutch mandatory programme lists transparency as one of the main objectives of its benchmarking study: *"The Benchmark focuses on providing openness to all the interested parties, including supervisory directors and shareholders. It is an instrument whereby the drinking water companies account for the way in which they implement their public duties. Transparency and efficiency are improved by publication of the results and the direction exercised by the board of supervisory directors and general meeting of shareholders."* [9].
- The goals of the IBNET database should also be understood in this regard. The objective of IBNET is to "*support access to comparative information that will help to promote best practice… By providing access to comparative information key stakeholders will get the information to do their jobs better.*" [20, 21].

This current trend in benchmarking programmes can sometimes lead to a restriction in the concept of benchmarking, so that benchmarking only involves the communication of results. It must be noted, that a management tool focused on learning and improvement differs greatly from a tool geared towards increasing transparency. For example, the recent resolution of the European parliament from September 2015 states that it *"…invites the Commission to set up a benchmarking system… in order to improve the quality of public water supply and sanitation services across the EU, and as a way of empowering citizens"* (European Parliament 2014-2019, 2015). An intensive multi-stakeholder dialogue took place in Europe between the EU Commission and stakeholder of the water sector. The European industry associations urged the European Commission to clarify the goals to be pursued. In the discussion it was emphasised that benchmarking should not be confused with measures to increase transparency and citizen engagement[4].

It should be mentioned that the effects of transparency on accountability and the so called "power of sunshine" are still being explored. Moreover, transparency concerns the provision of useful and meaningful information and that requires a lot of very specific thinking on the communication mechanism to be used (e. g. sent messages, potential addressees, communication tools, form of presentation, collection of feedback, etc.):

"Simply publishing the benchmarking results does not necessarily equate to more transparency." (Statement of Aqua Publica Europea in Multi-stakeholder dialogue).

[4] All documents in the dialogue are published by the European Commission *https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp*

Specially designed communication tools of tariffs and the background for tariffs from industry-based programmes from Canada and Germany are examples of such additional and focused communication (Figure 4). Information obtained from benchmarking programmes and performance assessment is used, not just by publishing a list of PIs, but by presenting targeted communication.

3 Key Success Factors of Performance Improvement in Industry-based programmes

3.1 Performance Improvement – the Main Challenge

A challenge many benchmarking programmes face, both within and outside the water sector, is to not regard the performance assessment stage as the final stage, but rather to continue to ensure change and improvement inside participating companies is achieved. The following quotes exemplify how benchmarking programmes throughout the world are facing this issue.

- When summarising current trends [3] states: *"Structured formal benchmarking needs to be given more emphasis, particularly involving face to face human interaction in order to learn and share details of best practices that can be implemented through effective and learned change management."*
- Also [22] has seen this trend: *"The focus of benchmarking studies has gradually shifted. In early studies, the focus tended to be on performance measures…. Recent studies have examined how non competitors and industrial outsiders learn how to improve business processes. Comparison of performance measures has developed into learning about best practices."* Even in the mid-90s a survey of 59 organisations came to the result that finding mechanism to "transferring best practices" was given the highest priority by respondents and therefore *"developing a process and mechanisms for transferring best practices is an area of high concern."*
- [14] writes about the finish of the performance assessment phase: *"Sometimes benchmarking exercises end right here, with glossy reports for external communication. However, at this point the benchmarking process is just mid-way and to get real added value out of the exercise, it is essential to go on with the next stage…The performance improvement stage is not just the most essential part of the exercise. It is also the most challenging part of all."*
- A South African manager summarizes that *"benchmarking has not really taken root in our sector in low and middle income countries (despite many attempts to introduce the concept), possibly because the approach is often seen as a tool to expose and embarrass, rather than as a tool to share experi-*

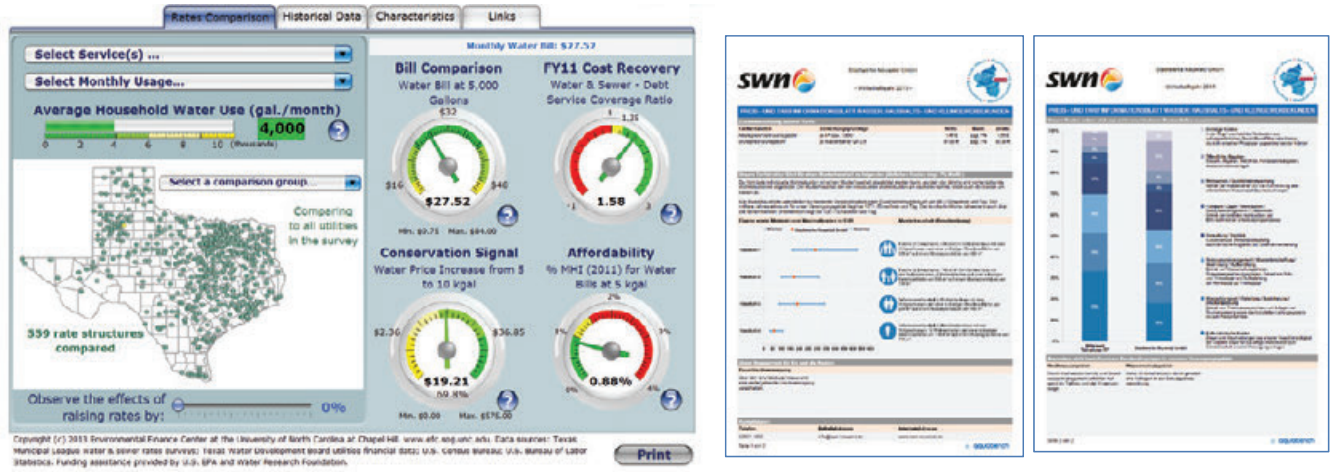


Fig. 4: German and Canadian tools for the communication of tariffs[5)]

[5)] Lombard & Main, 2013; Ministerium für Umwelt, Landwirtschaft, Ernährung, Weinbau und Forsten Rheinland-Pfalz, 2016

ences and learn from each other in a positive and developmental way." [23].

A survey conducted in 2012 of the activities in the German industry shed light on the main success factors for performance improvement in benchmarking [16]. The following success factors should be noted.

3.2 Benchmarking at the Process Level Induces Change More Directly

Benchmarking at the process level generally involves employing focussed assessment tools and systematically searching for best practices – exclusively relevant to a specific detail of the service (function, process, or task). For example, when benchmarking at the process level, the process owner (or manager of the process) is directly involved. The manager is best equipped to assess the effects of improvements and the meaning of performance indicators – especially by working continuously with the benchmarking method. It is safe to say that benchmarking at the process level generates more detailed action plans, closely related to the change of specific performance indicators. Furthermore, the link between operational change and changes in the indicators is possible almost exclusively at this level (Figure 5).

There are different approaches within benchmarking programmes which allow this, such as exemplified below:

- Benchmarking at the process level can be run as an independent, distinct and continuous programme with own distinct assessment model. The aquabench programmes have actually started with such an approach [24, 25]. These programmes have been running for almost 20 years, each having their own circle of participants and their own assessment system. More than fifteen methods have been developed to date, covering almost all parts of the water sector value chain[6)].

- In other international programmes benchmarking at the process level is mostly the result or consequence of the work at a corporate level. These projects are often run for a limited time, depending on the need of participants to focus more on given subjects. This is the case for the Canadian programme [26] and the programme of the six Cities group and the South African programme. An own assessment system is not always developed in such an approach. The work at the detailed "process" level and the search for best practices is not always done by separate performance indicators or assessment systems. Exchange of experience, focused analysis of process steps and/or tracking of selected performance indicators of the general assessment system are used as learning tools.

3.3 The Importance of Ownership of Management

Management involvement is essential to ensure improvement:

- *"In the implementation of the results lies the greatest (real) use for the companies involved in benchmarking projects. This phase at the end of the project lies, as a rule, completely in the hands of the companies, however it forms a compelling condition for a benchmarking project."* [6]

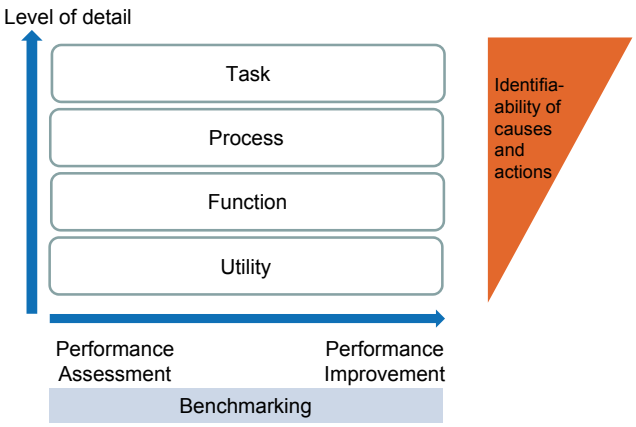


Fig. 5: The importance of the level of detail for identification of causes and actions in a benchmarking process

[6)] Another example is the programme of WSAA in Australia, where independent benchmarking projects are focusing on asset management or energy efficiency

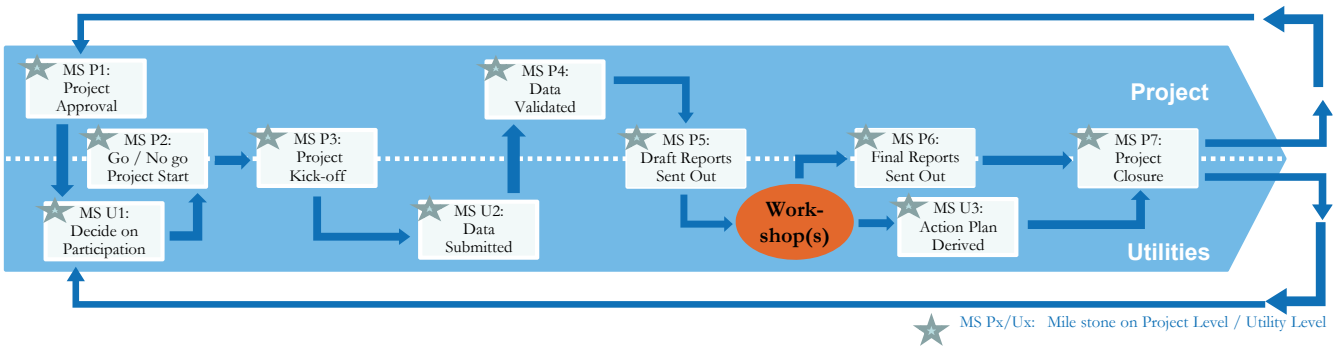


Fig. 6: Central role of workshops in industry based benchmarking programmes [14]

- The IWA Specialist Group on Benchmarking and Performance Assessment come to the same conclusion – without active involvement from companies and their management benchmarking does not lead to success: *"At this point, utility management needs to step in."* [14]

Modifications to operational practices must be in line with corporate strategies. The elaboration of benchmarking results and the integration of these results into operational activities require a high degree of individual decision-power by the companies. The local management should be able to take into account external constraints and internal factors, such as existing resources and priorities (up to and including the companies' readiness to change), and the knowledge must be incorporated in the benchmarking process.

The incorporation of management and greater ownership of management of risk for their companies is also key for the understanding of the new regulatory approach from Ofwat: *"We want a new approach, where companies are responsible for managing their risks ...."* [18], e.g. meaning that utilities are asked to devise own performance reports for the customer and explain to the customer their achievements. This approach results in reduced data collection efforts and much higher responsibility for the utilities.

In summary, the consequences of performance assessment are always to be determined and implemented for each participant individually. This cannot solely take place through an aggregated centralized report and without the involvement of participants.

3.4 Supporting tools and activities

Performance improvement can be supported by tools, the following aspects should be noted for this:

- Workshops are a crucial link between the assessment and improvement phase (Figure 6). [14] describe the goal of such workshops as follows:
  - Getting a common view on results
  - Analysing the reasons for deviations
  - Deriving the keys for good practices
  - Drafting action plans
  - Engaging in networking and Exchange
  - Improve methodology
- Clear documentation of action proposals and best practice solutions is needed. Continuous and regular benchmarking efforts allow tracking of such action proposals. Results and experiences of implemented actions and best practices can be shared within the project.
- In most industry-based approaches, rules on confidentiality of the information received creates, ensures, and protects a learning environment. Such agreements do not exclude agreed measures upon public disclosure activities.

4 International Search for Best Practice by industry-based approaches – Tendencies

The industry-based approach of benchmarking has started on national level, but soon has transferred also across the borders,

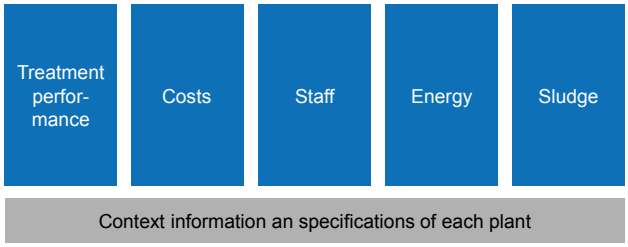
more and more projects and co-operations have been developed in recent years:

- The programme of the 6 Cities group in Scandinavia is an example of a programme developed by utilities. It was developed by the utilities from Sweden (Stockholm, Malmö, Gothenburg), Denmark (Copenhagen), Norway (Oslo) and Finland (Helsinki). Today the group is expanding and four more cities have joined from Norway (Bergen, Trondheim) and Denmark (Odense and Aarhus). It has 20 years of history and was one of the first programmes in the sector sharing its experiences in International publications [27].

Benchmarking at the process level "Wastewater Treatment Plants"

Based on 20 years of experiences in Germany, aquabench together with two major German operators (Emschergenossenschaft/Lippeverband and hanseWasser Bremen) invites to an international exchange of operational and technological experiences in WWTPs. With a proven record of success (more than 200 action proposals in three years of benchmarking and more than 270 participants), our methods help to obtain a detailed assessment of own performance and to enable systematic work on improvement opportunities.

Benchmarking at process level of WWTP is focused on important performance areas:



- Treatment performance
- Operational costs
- Staff
- Energy management
- Sludge treatment and disposal

The structured benchmarking approach

- takes into account differing context information and operational characteristics
- follows well known steps of benchmarking according to international and national standards, by German Water Associations (DVGW/DWA), European Benchmarking Co-operation (EBC) and International Water Association (IWA)
- brings in German data and experience from 20 years of benchmarking with more than 270 WTTPs
- works on action proposals for each participating plant

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Contact:

Eva Wortmann
e.wortmann@aquabench.de
phone +49 2203 35929-24

- European Benchmarking Co-operation (EBC) was founded by Dutch and Scandinavian industry associations in 2006. Its current board include Association of the European Federation of National Associations of Water Services (EurEau) and Danube Water programme (see below). The programme runs annually for Western European countries since 2006. Five regional benchmarking initiatives in Eastern Europe are supported by the programme since 2014. It has high influence on assessment and benchmarking standards in European water sector.
- The Danube Water Programme, a partnership between the World Bank and the International Association of Water Supply Companies in the Danube River Catchment Area, *"...supports policy dialogue and capacity development to achieve strong utilities and sustainable services in the water supply and wastewater sector of the Danube region."* [28]. Actually, regulatory programmes and programmes by industry associations are cooperating in Water Danube Programme. One cornerstone of its strategy is the support of supra-national benchmarking activities in several regional hubs, which are supported by the European Benchmarking Co-operation. In addition to that, the DANUBIS Water Platform is built up, which should *"...develop a regional, public performance indicator system for WSS utilities in the Danube Region, in order to allow for country and utility performance data comparison."* [29].
- The Water Service Association of Australia has developed an Asset Management Customer Value Project (AMCV). The AMCV, and the AMCV framework that underpins it, has been used by almost all large urban water utilities in Australia and over 50 participants worldwide since its inception. The initial project was commenced in 2004 with subsequent benchmarking rounds being held every four years to 2012. Currently a new round is starting.
- aquabench benchmarking methods are used by operators from Austria, Belgium, Poland and Switzerland. Its software is used by benchmarking programme of French public utilities (FNNCCR) and by Arab Countries Water Utility association (ACWUA) for regional benchmarking programmes. More than 10 trainings have been conducted for international experts in Arab countries and East and West Africa. Actually, also regulator in South America have consulted aquabench on advise on benchmarking tools. Currently, aquabench and German operators invite European operators to work with such method on an international level (see info-box).

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Authors

Dipl.-Ök. Filip Bertzbach
Dr.-Ing. Torsten Franz
aquabench GmbH
Ferdinandstraße 6
20095 Hamburg
Germany

e-mail: f.bertzbach@aquabench.de KA