# Knowledge Management and Retention in Finnish WWTPs

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# Content

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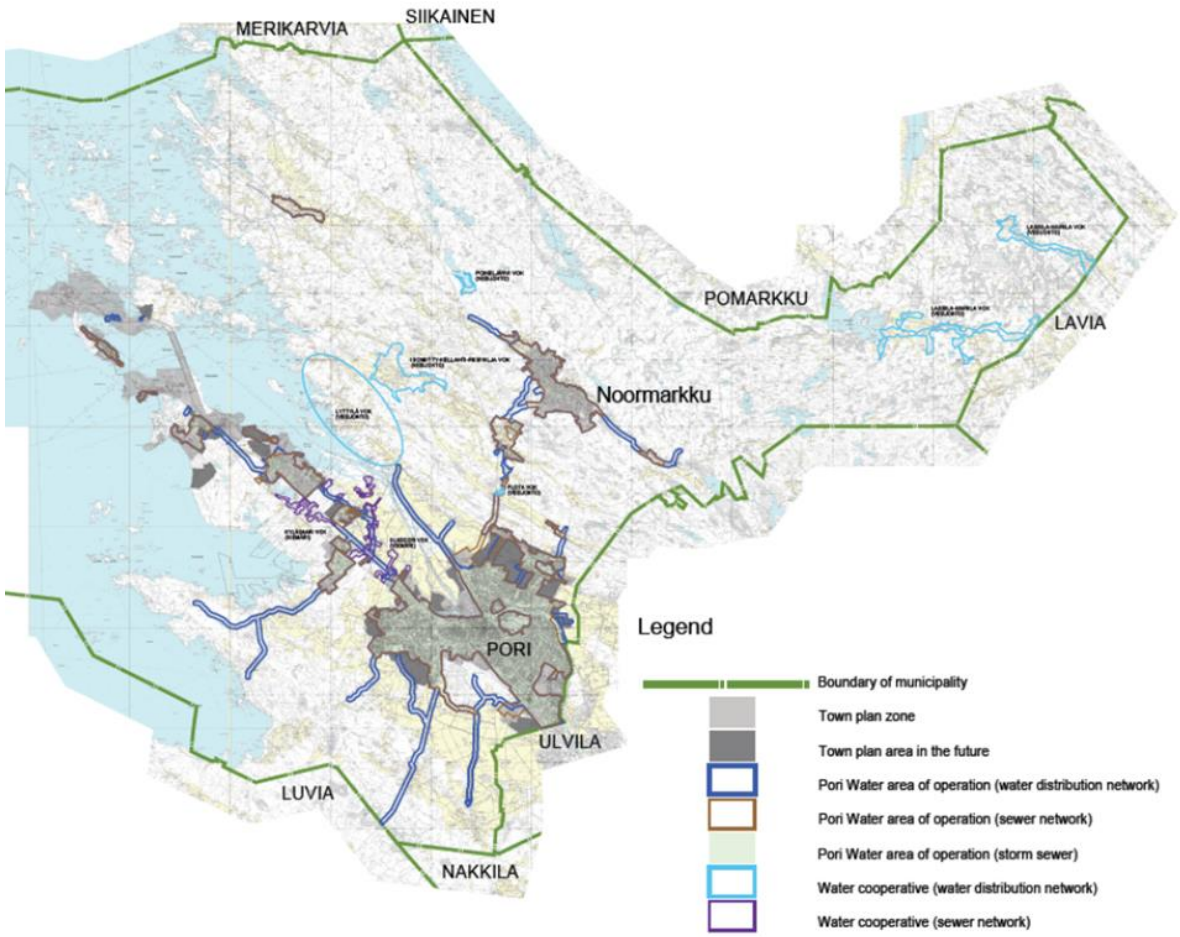
- Case example: municipal merger at Pori Water
- Learning, knowledge management and education at water works
- Need for integrated knowledge management strategy

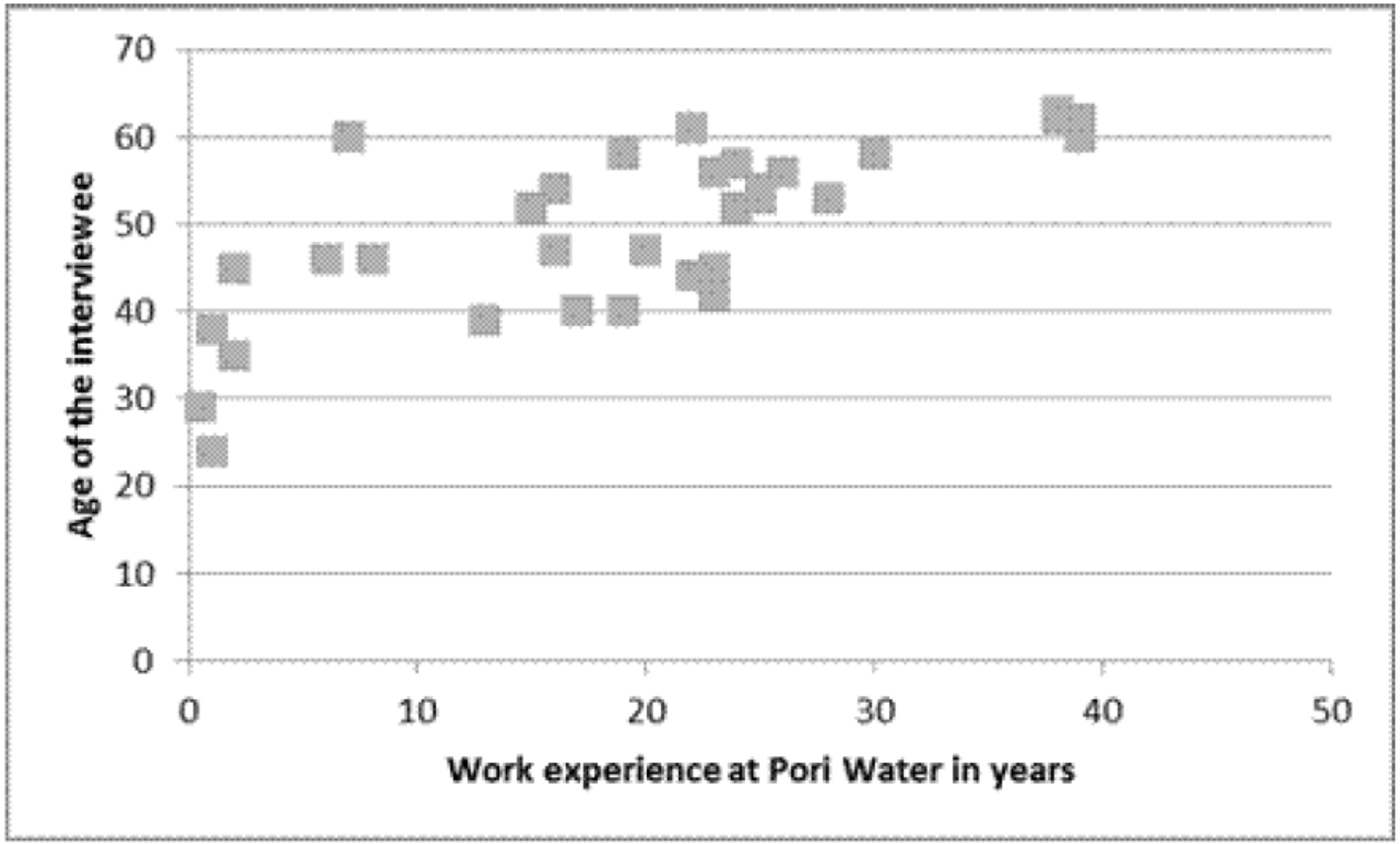
# Challenges in water services and knowledge management

- Nowadays water utilities likely operate in a more complex and challenging environment than ever before.
- They have to cope with requirements posed by technological developments, financial constraints, an ageing infrastructure, **ageing personnel, a diminishing workforce, operational efficiency**, resilience and sustainability.
- Knowledge management, especially tacit knowledge, is a critical success factor for water utilities when striving for better and more sustainable performance. Thus, utilities should **manage both explicit and tacit knowledge and transfer them to new generations of employees**.
- **Knowledge management supports learning in organisations**, where people, processes and procedures constitute a uniform entirety.

# Pori Water

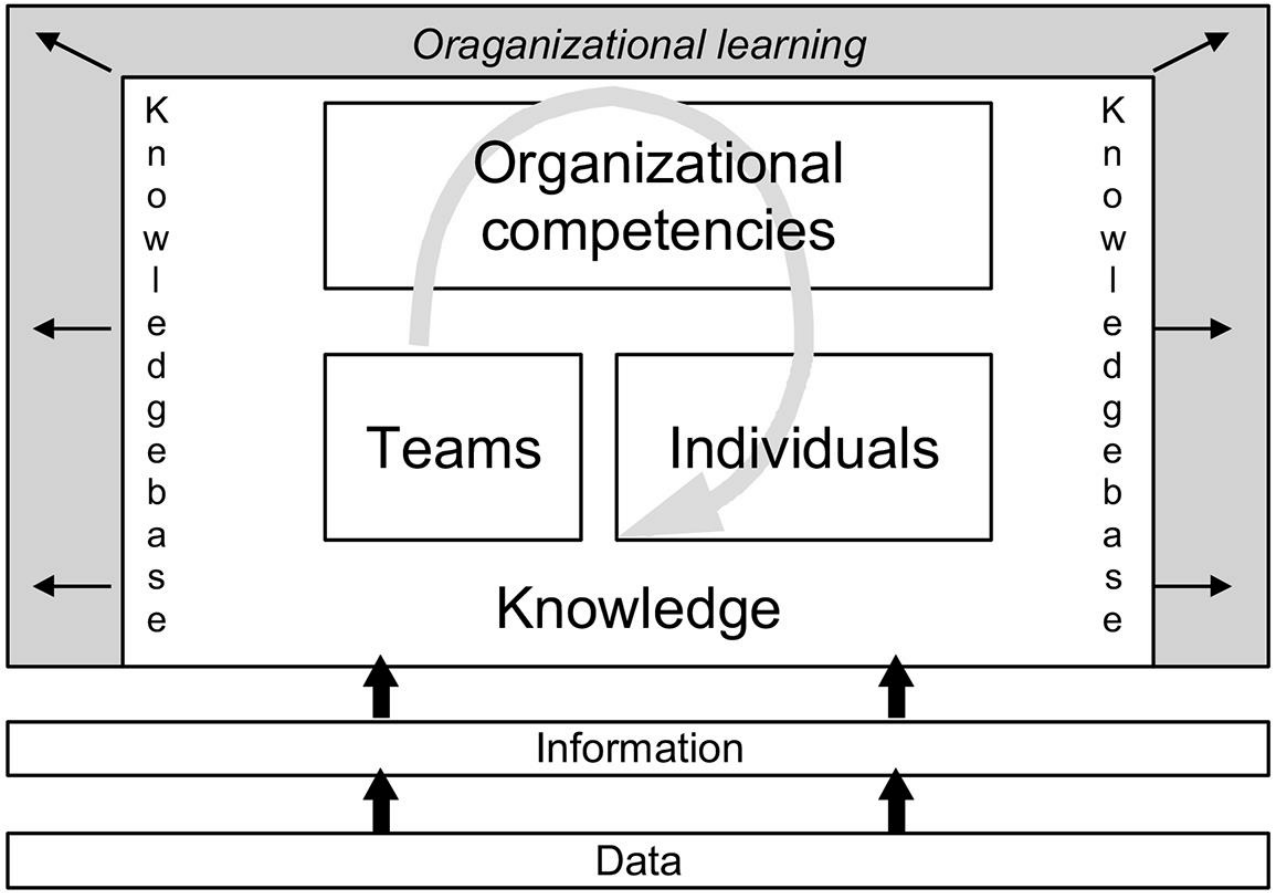

MERIKARVIA
SIIKAINEN
POMARKKU
LAVIA
Noormarkku
PORI
ULVILA
LUVIA
NAKKILA
Legend
Boundary of municipality
Town plan zone
Town plan area in the future
Pori Water area of operation (water distribution network)
Pori Water area of operation (sewer network)
Pori Water area of operation (storm sewer)
Water cooperative (water distribution network)
Water cooperative (sewer network)

# The age and length of tenure at Pori Water in 2013



# Organisational knowledge base

(adapted from Probst et al. 2000, Managing knowledge: building blocks for success)



# Knowledge creation and organisational learning

- Only 20 percent is learned through formal education or training organised outside the workplace. Formal training can provide only some knowledge of engineering, science, operation and maintenance.
- **People learn about 80 percent of their skills at work**. Experience at water utilities and on-the-job training has to provide the needed expertise, because water utilities need stable technical workforces which cannot be directly transferred from other industries.
- **Employees develop skills on-the-job.** Many employees gain skills over decades; the process is partly tacit.
- **New knowledge is developed by solving current problems** occurring while performing tasks and combining the solutions with the organisational processes and personnel's skills. Employees learn with and from each other by solving actual problems and doing practical work. If the tacit knowledge created in daily work could be made visible and fully utilised, organisations would learn and develop faster.
- Learning also takes place in meetings and other discussions. The prerequisites for learning in these settings are social skills and a **good working atmosphere**. If the working environment understands and accepts differences, learning together can foster the learning process and enable learning from each other. Everyone can learn: **newcomers from those with much working experience and vice versa.**

# Organisational culture, sharing atmosphere and innovative environment

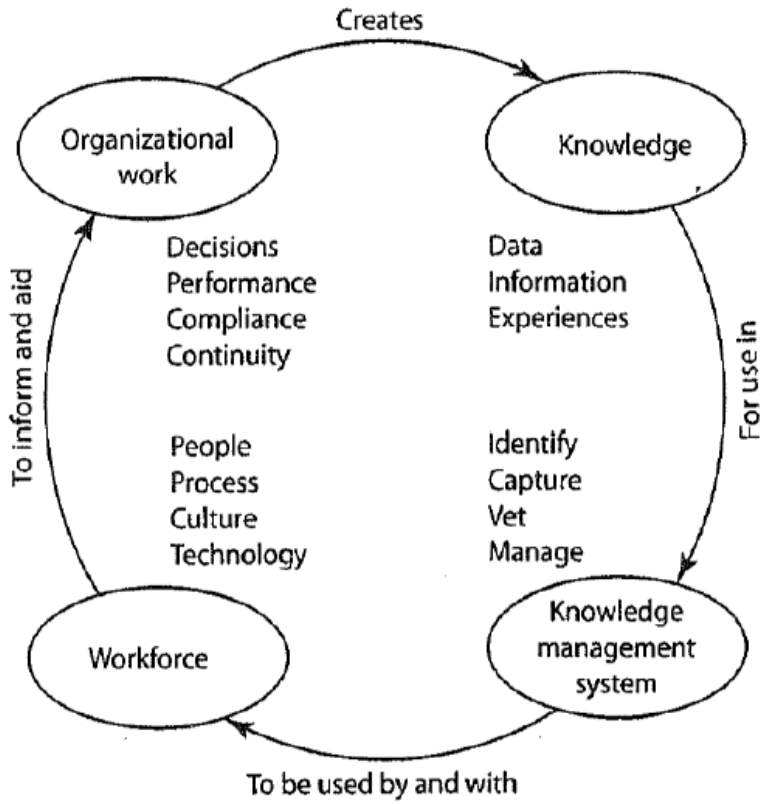
- The organisational culture is closely related to organisational learning and to how the employees' knowledge and skills are utilised. It also affects the personnel's possibilities to attend further education and continuous training and how committed they are to the organisation. Action should be taken towards establishing a single **shared, common culture**.
- The knowledge sharing environment should be open, and there should be **enough space and time for creativity**. This would remove a major obstacle – not having enough time – that is preventing the dissemination of information and knowledge.
- **The personnel should feel that their skills and knowledge are valued**. They should be made aware that sharing knowledge will benefit both the person and the organisation, and that employees' positions will not be threatened if they share something.
- **Each individual contributes to the organisational development, change and more efficient working environment.** Perhaps reward or other benefit systems should be used for showing appreciation of effective sharing.

# Professional training and career development

- Water utilities should also try to **encourage personnel to rotate between units and tasks** within the utility or with other regional water utilities. That would affect the organisation in two ways: it would gain hold of its own resources and make tacit knowledge available to others, which in turn would lead to possibilities to create new knowledge.
- Possibilities for job rotation and career development in the utility might also keep the personnel motivated and keep them in the organisation. How the **millennial generation** (born in 1981−1999) change the workplace and how water utilities should respond to that challenge are questions that need to be tackled quite soon.
- Formal, professional education gives general qualifications for the tasks, but particular knowledge and skills are learned on-the-job. **Professional training, including vocational training and apprenticeship or competition-based tests should be utilised in a systematic way at the utility.**
- Supplementary education and training courses for water utility personnel should also be seen as investing in the future. It should be emphasised that today's working life is so hectic and turbulent that, in order to survive the competition, **lifelong learning** of the personnel should be seen as a responsibility of both the employer and the employee. **The personnel should be included in discussions on what kind of training really is needed and how to best organise events.**

# Integrated knowledge management strategy

(Source: Grigg and Zenzen, 2009)



# Knowledge management and development strategy

- **It is essential for an organisation to know what data, information and knowledge are needed for various tasks and units, and especially where tacit knowledge is hidden.** The amount of critical knowledge, i.e. data, information, knowledge or tacit knowledge, critical for the sustainable operation of water utility, is huge. Similarly, the information overload from where the critical knowledge should be traced is vast.
- Water utilities should evaluate which **core competencies** need a permanent employee, which of the competencies could be acquired with further educating current employees, and which activities could be outsourced or produced in co-operation with other organisations.
- **Quality management etc. systems alone do not solve the challenges of knowledge retention.**
- Effective communication media, including technological solutions and knowledge management programmes, like the water and wastewater network information system, should be fully utilised.
- **Information and knowledge sharing structures and media should be planned and implemented to meet the various needs and capabilities of different personnel groups**.

# Knowledge management and development strategy

- **Tacit knowledge should be rooted in knowledge management systems, and it has to be seen as a part of work management.**
- The tacit knowledge, possessed especially by experienced personnel with a long working history, should be made explicit. **Tacit knowledge capture, like knowledge capture in general, can be done along with normal daily tasks, by regular knowledge audits or by exit interviews.**
- The easiest way to transfer knowledge, especially tacit knowledge is **sharing** it with other employees, through, for example, formalised mentoring or master-apprentice systems, storing it in documents and manuals, making videotapes or taking digital photos of pipeline construction and renovation sites, equipment and treatment processes, or employing external interviewers.
- By **collecting and analysing stories** – especially on customer relations and work procedures – water utilities can gather valuable information, which can be used in developing its services and work methods.
- In addition to traditional, i.e. face-to-face storytelling, communicating stories can be done digitally and shared on the utility's intranet or other closed platforms, for example.

# Knowledge management at water utilities

- **Prior to retirement, employees should take part in special development discussions where critical work tasks and vital questions on how to capture and transfer knowledge are covered.**
- Knowledge management calls for quality management systems or enterprise resources planning or other expert systems, and working and workplace orientation instructions. Regular quality audits ensure that the water utility operates according to the requirements.
- **Hiring new personnel should start well in advance so to facilitate knowledge transfer.**
- **Effective orientation needs not only time but also other resources**, like the necessary knowledge management tools. Visual web-based occupational instructions and work guidance (including water and wastewater treatment processes flow-charts, animations, etc.) with efficient search possibilities should be created and used together with printed notes. Web-based information distribution will not alone be adequate; mentorships would be effective on-the-job training means. **In mentoring, employees with more experiences transfer knowledge to those with less experience.**
- Knowledge management is a day-to-day action, which needs **attitudinal change** in the whole organisation. Teamwork skills and pair work skills are required.
- Critical knowledge can be captured during thematic days or years. At large water utilities the themes could be applied on a unit basis, like the network, the treatment facility, etc., and at small water utilities in its entirety.
- Learning from mistakes.
- Feedback through social media.

# Knowledge retention and tools

- Organisational forgetting represents, in a way, underutilisation of knowledge. If the knowledge gaps in organisations are not discovered, the added value of knowledge will be lost. The organisational knowledge process is a continuous task, which includes further identification and creation of knowledge.
- Knowledge preservation processes consist of selecting the material worth retaining, storing it in a suitable form in the organisation's knowledge base and updating the knowledge.
- Possible tools:
  - Analysis and synthesis tools, like social network analysis and knowledge mapping
  - Communication and relationship, e.g. peer mentoring, communities of practice, conferences
  - Information systems, e.g. document management, records management
  - Learning systems, like distance-learning
  - Management systems, e.g. best practices, project management, digital asset management
  - Software, among others data analysis and groupware
  - Web knowledge portals and systems, e.g. the internet, intranet.

# Further information

Sandelin, S. (2017). Knowledge Management and Retention: A Case of a Water Utility in Finland. (Tampere University of Technology. Publication; Vol. 1476). Tampere University of Technology. Available https://tutcris.tut.fi/portal/files/10828021/sandelin_1476.pdf

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