Make a game-changing impact – before the others do
The impact of digitalization in district heating
12/2016
-We introduced a major 5-year energy changing project, and we achieved a 6-year payback period

- What role did heating companies play in the project?

-None whatsoever.

- Why not?

- Good question... It did not even cross our minds that they would have the knowledge or interest to help us save energy...
## Summary

**Digitalization is speeding up the transition**

*District heating companies must decide on their role as the demand for heating energy decreases and the availability of alternative heating methods improves*

### The role of digitalization in the operating environment of district heating suppliers

The changes currently taking place in the operating environment present district heating companies with both opportunities and threats. One of the trends affecting the district heating business is digitalization, which will change the ways of working, business models, services and products as well as the customer experiences. Besides digitalization, the operating environment and business operations of district heating suppliers are affected by the improved energy efficiency in buildings and better access to alternative heating methods, both of which continually reduce the demand for heating energy. The major wave of modernization, which will shake the basic structures and business models, is yet to come.

### Change in customer behavior

Changes in customer behavior will drive change in the way businesses work – digitalization will bring new methods to meet the changing needs.

- Above all, customers value easy solutions and are typically not interested in actively communicating with the energy supplier.
- Customers wish for a professional partner who can offer easily accessible overall solutions.
- Other key motives behind customer behavior are reliability of operations, securing required operating conditions and the clarity of service content and pricing.
- The unmet needs of district heating customers create a vacuum which can be filled by various competing operations, such as energy efficiency consultants or providers of alternative heating methods.

### The impact of digitalization

Digitalization affects the value chain in the district heating business every step of the way – competition in the field will become stiffer.

- Digitalization will speed up the ongoing transition in district heating – a key role in the competition between different methods of heating will be played by the actors’ capacity to leverage the opportunities presented by digitalization.
- The amount of knowledge will increase with digitalization, and so will customers’ awareness of available options and the likelihood of customers seeking higher energy efficiency and switching to another method of heat production.
- Highly developed technologies are within everyone’s reach and real-time data related to the supply and consumption of heating will be more readily available than ever.
- Blockchain technology and AI enable the development of smart, distributed networks.

### Opportunities created by digitalization

Digitalization will create a broad range of opportunities from improved efficiency to complete transformation of the business operations.

- Digitalization can be leveraged in:
  - the development of customer experience and in engaging the customer;
  - the creation of new business models, products and services;
  - improving the efficiency of and optimising the core business;
  - Improving the efficiency of and optimising the support functions.
- Digitalization supports the emergence of new roles and business models with district heating companies, other operators in the field and external third parties.
- District heating companies must select their digitalization strategies to drive the change – listening to the customer, the company’s culture and an experimental approach are key.

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Digitalization as the driver for change
What does digitalization mean in general?
Digitalization

Digitalization refers to development powered by technology. Digitalization changes the way we behave and operate, the way the customer experience is formed, business models, services and products. Digitalization affects the competitive positions and breaks down traditional barriers between business segments.

Digitalization makes things easier and faster. More and more tasks can be automated thanks to technology, without the need for human, manual input.

Source: Deloitte analysis
“There is no doubt that new services are on their way in. We need to cannibalize our own business by offering energy saving services. If we don’t do it, somebody else will.”

Source: Expert interviews

District heating company
Digitalization driving change
Digitalization is one of the strongest trends affecting the district heating business

Changes in the business environment...

- Urbanization
- Climate change and carbon-free future
- Rising environmental values
- Regulation concerning new construction production and renovation
- Improving energy efficiency
- Regulation on district heating industry
- Developing energy technology
- Availability and price of alternative heating systems
- Digitalization
- Distributed generation

...create challenges and opportunities for district heating companies

- Where we can find growth in the future? Have we investigated all relevant options?
- What do our clients really need now and in the future?
- Who are our main competitors? Will there be newcomers or substitutes in the market?
- Are we able to improve our competitiveness? Are we able to maintain our current clients?
- What should we prioritize?
- What won’t we need in the future?

How can digitalization help to address these challenges?

Source: Deloitte analysis
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Digitalization driving change
Utilities are still a little way off the pace in digitalization

**Media**
Digital has changed the way media are produced, distributed and consumed, and how the consumption is monetized – e.g. Spotify and Netflix.

**Retail**
Large players, such as Amazon, have broadly utilized digitalization, and generally online channels have become a must-have for retailers. Fresh products’ e-sales are increasing.

**Telecom, Financial and Professional Services**
In addition to IT, Telecom has been a major enabler in digitizing other sectors. Financial and Professional services rate digital high on their agendas, not least because of disrupting startups.

**Logistics**
Supply chain optimization is developing, powered by connected vehicles and goods, but autonomous means of logistics and crowd platforms are still at a very early stage.

**Healthcare**
The industry has digitized some core operations, but e.g. new business models are still emerging. Some promising startups have gained publicity.

**Utilities**
Very few steps taken towards extensive digital business. Some ‘smart’ meters are installed, but the utilization of the data and customer relations is still narrow. Focus on internal operations.

**Public Services**
Because of the non-competitive scene, not much effort is generally made in digital. However, the cost saving potential has driven some services to be digitized.

*Sources: Deloitte University Press, Deloitte analysis*
Digitalization as the driver for change
Long-term success may prove a hindrance to development – the energy sector has its own cross to bear

<table>
<thead>
<tr>
<th>District heating operators may have qualities...</th>
<th>...that have proved a disadvantage in other sectors...</th>
<th>...when disrupting startups relying on digitalization have entered the markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good resources</td>
<td>ANTILA, STOCKMANN, TAKSI, posti, mtv3, NOKIA, Amazon, Uber, Zalando</td>
<td></td>
</tr>
<tr>
<td>Market leadership</td>
<td></td>
<td></td>
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<tr>
<td>Decades-long planning periods</td>
<td></td>
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<tr>
<td>Good, controlled profits</td>
<td></td>
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<td>Natural monopoly</td>
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<tr>
<td>Internal rigidity</td>
<td></td>
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<tr>
<td>Slow innovation</td>
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</tbody>
</table>

High switching costs have prevented a rapid loss of customers in the district heating business – the stagnation of district heating companies will, however, create a vacuum asking to be filled by (digital) disrupting startups

Source: Deloitte analysis
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The needs of district heating customers
What do district heating customers value and need?
The behavior of district heating customers
The change in customer behavior drives business sectors towards change – digitalization provides a tool to respond to the changing behavior

<table>
<thead>
<tr>
<th>The make-or-break customer experience</th>
<th>Tailored services</th>
<th>The importance of impressions</th>
</tr>
</thead>
<tbody>
<tr>
<td>An interactive customer experience may either consolidate a customer relationship or destroy it</td>
<td>Customers expect clearly packaged service experiences that are as personalized as possible</td>
<td>Purchase decisions and customer loyalty are increasingly strongly based on image and impressions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shift in power</th>
<th>Emphasis on the social aspect</th>
<th>Blurred boundaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>The power is being shifted to an increasing degree to the customers (e.g. ownership and use of customer data)</td>
<td>The selling of products and services has gained a strong social dimension</td>
<td>Expectations of the level and quality of services are constantly increasing – comparisons are made across sector boundaries</td>
</tr>
</tbody>
</table>

digitalization not only affects customer behavior and expectations, but also provides tools for the development of the customer experience, business models and service offering.

In the development work based on opportunities offered by digitalization, three issues are vital:

1. The product/service must be **desirable from the customer perspective**.
2. The product/service must be **technically feasible**.
3. The product/service must be **financially profitable**.

District heating companies must be aware of their customers’ everyday lives and identify the things and activities that customers are genuinely interested in and prepared to pay for.

Source: Deloitte analysis

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The segmentation of district heating customers
Segmenting is based on the motives related to customers’ heating service preferences, such as reliability and price

In the analysis of customer needs, district heating customers are segmented according to these motives. The question asked in this analysis is, “What key motives* does the customer have regarding district heating? And how should these needs be prioritized?”

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* Motive = the reason or rationale behind an action. Sources: Customer interviews, Deloitte analysis
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KEY FINDING FROM THE INTERVIEWS:

Customers want a professional partner who can offer easily accessible overall solutions.

Individual digital services, such as usage monitoring, are interesting but do not provide significant added value to the customer.

Source: Customer interviews
The needs of district heating customers
Summary of the identified needs by segment

<table>
<thead>
<tr>
<th>CUSTOMERS ARE PARTICULARLY INTERESTED IN:</th>
<th>CUSTOMERS DO NOT WISH TO BE INVOLVED IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Securing reliability</strong> – customers are prepared to pay to minimize risks to their business operations</td>
<td><strong>Manual adjustments &amp; optimization</strong> – customers are not prepared to spend time on heating optimization</td>
</tr>
<tr>
<td><strong>Securing health and safety</strong> – customers approach (business critical) operating conditions as a whole, and heating is just one factor among many</td>
<td><strong>Heating method</strong> – instead of heating methods, customers need to discuss what the different heating operatives can offer them through their services</td>
</tr>
<tr>
<td><strong>Open communication and true partnership</strong> – customers are prepared to invest time in optimizing the heating supply, but need the assistance of a professional and profitable partner in this</td>
<td><strong>Raw consumption data</strong> – customers are interested in final conclusions</td>
</tr>
<tr>
<td><strong>Securing health and safety</strong> – customers approach (business critical) operating conditions as a whole, and heating is just one factor among many</td>
<td><strong>Professional consultation on the status of properties based on benchmarking</strong> – customers are interested in comparative data for facilities and properties</td>
</tr>
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<td><strong>Professional consultation on the status of properties based on benchmarking</strong> – customers are interested in comparative data for facilities and properties</td>
<td><strong>Raw consumption data</strong> – customers are interested in final conclusions</td>
</tr>
<tr>
<td><strong>Transparent overall solutions</strong> – customers want to see their heating services presented in concrete, plain language</td>
<td><strong>Individual solutions</strong> – customers want clear and easy solutions that include the entire property stock under their management</td>
</tr>
<tr>
<td><strong>Overall economy</strong> – customers want to understand the effect of the services they have selected on the annual user expenditure in the long run</td>
<td><strong>Provider-dictated pricing</strong> – customers want more influence over the user costs of heating services</td>
</tr>
<tr>
<td><strong>Flexible solutions</strong> – customers are concerned about vendor lock-in and want to reserve the right to reorganize their heating services in a different way in the future</td>
<td><strong>Overall responsibility for heating services</strong> – customers want a partner to assume the responsibility for the implementation and optimization of the heating services</td>
</tr>
<tr>
<td><strong>Decision-making &amp; competitive tendering</strong> – customers are not prepared to make decision on heating services without the necessary knowledge about the field</td>
<td><strong>Raw consumption data</strong> – customers are interested in final conclusions</td>
</tr>
</tbody>
</table>

Sources: Customer interviews, Deloitte analysis
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The impact of digitalization on district heating

How will digitalization change the operating environment for district heating suppliers?
The impact of digitalization on district heating
Digitalization affects the value chain in the district heating business every step of the way

### The general value chain in DH

<table>
<thead>
<tr>
<th>District heating consumption</th>
<th>District heating distribution</th>
<th>District heat production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>District heating and cooling networks</td>
<td>Fuel production and transport</td>
</tr>
<tr>
<td>Consumption</td>
<td></td>
<td>District heating and cooling production</td>
</tr>
<tr>
<td>Customer service</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Actors

- **Customers (households, housing companies, business premises, industrial facilities, public organizations), building managers, technical building services providers etc.**
- **Network management, designers, contractors, housing companies and component suppliers**
- **Fuel and district suppliers, logistics partners, facility designers, contractors and component suppliers**

### Key trends in digitalization

<table>
<thead>
<tr>
<th>Mobile devices and user-oriented mobile services</th>
<th>AI</th>
<th>Blockchain technology</th>
<th>IoT (smart cities, connected homes)</th>
<th>Augmented reality</th>
<th>Analytics and big data</th>
<th>Robotics</th>
</tr>
</thead>
</table>

### Examples of the key effects of digitalization

- Customers’ increased demands for services (personalization, added value)
- The increase in the demand and use of digital self-services
- Increased transparency and comparability of prices
- Lower threshold for switching heating methods and suppliers
- The increasing amount of data to be collected and utilized, more complicated data management and higher demand for knowledge-based services
- The greater importance of customer experience and customer engagement
- Modelling and analytics in network design, investments and contracting
- Remote control and monitoring of the network and substations
- Predictive servicing and maintenance through sensors and analytics
- The introduction of mobile systems in maintenance management
- The optimal management of network load including local heating supplies
- Optimized fuel deliveries and supply based on consumption and weather forecasts
- Predictive servicing and maintenance through sensors and analytics
- Leveraging data and analytics in the scheduling of investment
- More efficient energy trading
- The development of new revenue models, products and services
- Digitalization of all support functions (incl. invoicing, payment collection, payroll)

**Sources:** Customer interviews, expert interviews, Deloitte analysis

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The impact of digitalization in district heating

Digitalization increases competition between heating methods and the growing service business operations within the field.

Technology production costs will grow smaller
Customers are offered several alternative production methods and better possibilities for optimizing their consumption of heating.

Information about alternatives is more readily available
The threshold for switching production methods, suppliers and service providers becomes lower.

Real-time data is more widely available
Accumulating the awareness of customer needs using analytics, fulfilling customer needs using analytics (service content, timing of service offering).

New products and services
Service and product portfolios will continue to expand beyond traditional heat supply and sales, competition will no longer be limited between different forms of heating.

Ecosystems and networks have more to offer to customers and heating suppliers
The operating model typical of the digital era enables the expansion and new optimization of the business operations of district heating companies.

AI and blockchain technology enable smart distributed networks
Customers will benefit from easier price comparison, purchasing distributed energy products and smart meters.

Expectations for customer experiences come as a given to district heating companies
The level of customer expectation is based on customer experiences.

Sources: Expert interviews, Deloitte analysis
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Opportunities created by digitalization

What type of opportunities does digitalization open up for district heating companies?
The four interrelated areas with digital potential for district heating companies – focus on customers, enabled by digital operations

**“Broaden the view”**

- **Customer experience & engagement**
  - Digitalization enables the building of a fully digitalized service path and a personalized multichannel customer experience.

- **New business models, products and services**
  - Digitalization enables a deeper understanding of customers’ needs and changes in the earning logic and pricing models in business operations.

**“Enhance the performance”**

- **Core operations and costs**
  - Digitalization enables a more efficient optimization of production and the distribution network as well as a better timing of investments.

- **Back office operations**
  - Digitalization enables processes based fully on electronic data management and a higher automation rate.

Source: Deloitte insight
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Opportunities created by digitalization

Digitalization will create a broad range of opportunities from improved efficiency to complete transformation of the business operations.

- **Full transformation**
  Changing the operating environment and role of the company. Lateral thinking when envisaging services, products and revenue models and superior operative efficiency through leveraging the opportunities offered by digitalization.

- **Accelerating change**
  The fullest possible automation in business operations and use of data in all company activities (insight driven organization). The cannibalization of traditional business operations will speed up and new revenue models become established.

- **First steps towards the new**
  Identification of new business opportunities and the ongoing streamlining of current business activities. The margins in a new business operation may be high, and the volumes lower, compared to traditional business operations.

- **Controlled development**
  Improved efficiency and profitability through the digitalization of support and core functions. Serves as a basis for more broad-based development of operations. Profitability may improve, but new business is not created.

Sources: Deloitte analysis
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Opportunities created by digitalization

The identified needs of DH customers serve as an incentive for companies to undertake a complete development of their business operations.

**Identified customer need**

- **Transparency, overall economy**

**Business development in district heating companies**

- **Digitalization of core and support functions, electronic data management, transparent pricing in the tendering process, real-time and reliable reporting to the customer**

- **Customer-oriented service development, leveraging data-based customer analysis, understanding customer needs, packaged services, CRM**

- **Expansion into new services and fields, responding to an ever wider range of customer demands with the company’s own service portfolio**

- **Desire to expand the role of the consumer of heating to include the supply of heating**

- **Identification of the new role and new business opportunities in a distributed digital multi-supplier network**
Opportunities created by digitalization
Digitalization creates development paths that DH companies towards new roles in a changing operating environment

### Development trends supported by digitalization

<table>
<thead>
<tr>
<th>Limited development</th>
<th>Full transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Using individual remotely read meters for each dwelling/facility. Collection of customer and consumption data. Leveraging technology in support functions.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Data is collected from systems, customers are offered reporting and automated notification services. Collected raw data are sold to third parties.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>District heating offered as a <em>turn key</em> service by expanding business operations into maintenance and servicing.</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Data sourced from the network, production, usage and weather conditions are combined, which helps achieve superior efficiency and predictable property management and maintenance.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Added value created for customers through forecasts and dynamic occurrence reporting and the possibility to make comparisons with other properties.</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Consumption data are used for consultation in energy saving though system optimization and structural repairs.</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>Serve as operators in a dynamic multi-supplier consumer network based on digitalized optimization and contracts</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Sell to customers what they care about the most: the operating condition. An operating condition may be priced with a flat monthly rate.</td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Create a service platform for housing with service providers offering their own applications and services.</td>
</tr>
</tbody>
</table>

### Sources
Customer interviews, expert interviews, Deloitte analysis

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Opportunities created by digitalization

Digitalization emphasizes the change in the roles of different operatives and the new opportunities now available to new providers.

Digitalization supports the emergence of new roles and business models with district heating companies, other operators in the field and external third parties.

The elements of the relationship between energy seller and customer in the future

- **Energy seller**
  - Heating suppliers can freely choose their future role: they may remain pure heating energy suppliers or expand their service offering into new service segments and enter into closer interaction with end customers.

- **End users**
  - Customers are looking for partners who can give them an easier everyday life, more stable conditions and better cost-efficiency. The role of the service provider (e.g. energy efficiency, heating management) may be taken by service providers with expertise (incl. some building management companies) or heating companies.
  - End users will serve as heating suppliers and sellers to an increasing extent.

- **Specialized service providers**
  - The role of the technical operatives (those concentrating on energy system management) will reduce. Various players will increasingly be taking the operative role. Larger operatives (e.g. building management companies) can develop their expertise if they so wish to be able to offer a wide range of building technical services.

- **Building managers, management companies, property service businesses**

Sources: Customer interviews, expert interviews, Deloitte analysis
## Sources

<table>
<thead>
<tr>
<th><strong>Customer interviews</strong></th>
<th><strong>Sector and expert interviews</strong></th>
<th><strong>Public sources</strong></th>
<th><strong>Deloitte’s experience</strong></th>
</tr>
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<tbody>
<tr>
<td>The customers of district heating companies</td>
<td>District heating and energy companies</td>
<td>Company websites</td>
<td>Deloitte studies</td>
</tr>
<tr>
<td>Consumers and businesses who have selected another heating method</td>
<td>Component suppliers for district heating networks</td>
<td>Sector reports</td>
<td>Deloitte analysis</td>
</tr>
<tr>
<td></td>
<td>Big data application providers</td>
<td>Academic studies</td>
<td>Deloitte’s expertise and experience in other fields</td>
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<td></td>
<td>Energy management expert company</td>
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<tr>
<td></td>
<td>Energy expert, adjunct professor</td>
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## Contact details

<table>
<thead>
<tr>
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<th>Anne Grönberg</th>
</tr>
</thead>
<tbody>
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</table>
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