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NORDIC MUNICIPALITIES' WORK WITH ARTIFICIAL INTELLIGENCE

Nordic municipalities' work with artificial intelligence

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The study shows that trust in municipalities can be both strengthened and weakened when AI is used. It is important to introduce the technology in the right way, and good planning for this is crucial.

Preface

Municipalities in the Nordic region are working with artificial intelligence (AI) in many areas. Chat bots answer questions from citizens, algorithms can predict leaks in the water and sewage networks, and tests are underway to ascertain how the technology can support municipal case officers.

A technological revolution with fantastic opportunities has begun. New technologies such as AI are important tools for tackling many of the challenges facing the Nordic countries. Among other things, we can use AI to fight climate change, save lives in healthcare and streamline the public sector.

At the same time, we need to maintain the trust in the Nordic region. When the public sector uses AI, this can affect the population's trust in the public sector both positively and negatively. The population's view of the public sector has consequences for broader social trust, which is high in the Nordic region and crucial for our social model.

It is largely in their encounters with the municipalities that citizens' impressions of the public authorities are shaped. The Analytical and Statistical Unit at the Nordic Council of Ministers has therefore investigated how selected municipalities in the Nordic region work with AI, and how trust in the Nordic region is affected as municipalities use more and more of this technology.

The study shows that trust in municipalities can be both strengthened and weakened when AI is used. It is important to introduce the technology in the right way, and good planning for this is crucial.

I hope that this report will prove useful to municipalities intending to work with AI. The report highlights its social impact so that we can use the technology not only for the good of the people, but also to increase trust in the Nordic region.

The report was written by Truls Stende, assisted by Ulf Andreasson, at the Nordic Council of Ministers' Secretariat's Policy Analysis and Statistics Unit. It is part of the unit's report series highlighting topics that are highly relevant from a Nordic perspective.

Copenhagen, October 2019

Paula Lehtomäki

Secretary General

Nordic Council of Ministers

Summary

This report concerns how selected municipalities in the Nordic region are working with artificial intelligence. The report discusses how the introduction of the technology may affect trust in the Nordic region, both in terms of the population's trust in the public administration and social trust.

Since the municipalities in the Nordic region are quite similar in many areas, it is interesting to have a Nordic perspective on the topic. Administrative traditions across the Nordic region are relatively similar, and the public sectors are based on common values such as openness, equal treatment and efficiency.

By and large, the municipalities investigated had not come that far in using artificial intelligence. They were planning how to use the technology or testing it. Some had started using the technology in some areas. At the same time, it was clear that the municipalities saw the potential and that development would soon accelerate. The municipalities had two main rationales for using artificial intelligence: They wanted to provide better services to citizens and conduct their activities more efficiently.

Some municipalities used artificial intelligence for less complex tasks involving communicating with citizens, such as for sorting enquiries or answering questions using chat bots. Several had tested whether the technology could be used as decision support in more complex case processing, including in processing planning applications and in the labour market area, but none had implemented the technology to do this yet. None of the municipalities had taken what might be considered the next natural step: developing artificial intelligence to make decisions on its own in complex matters that currently require significant human judgement.

One of the strengths of the technology is that it can anticipate problems and be used as a basis for taking early action. This can be done to achieve very different aims, which in turn have consequences for the ethical issues that should be taken into account. A couple of municipalities were using artificial intelligence to prevent leaks in the water and sewage network. Others were once again considering whether the technology could be used to identify people or businesses at high risk of undesirable development so that the municipality could take action at an early stage. However, the latter use had not yet been implemented.

The investigation indicated that the introduction of artificial intelligence can have both a positive and negative impact on citizens' trust in municipalities and, by extension, social trust. The population's perception of the public administration, for example, whether they think it is fair and effective, affects social trust: when citizens trust municipalities and the state, they also trust each other.

If the municipalities are perceived as open about how they use artificial intelligence, and the technology improves municipal services by increasing efficiency, equal treatment and service, the population's trust in the

municipalities may increase. This requires the municipalities to proceed in an appropriate manner. If they do not, there is a risk of artificial intelligence being perceived as weakening the principle of equal treatment and democratic governance mechanisms, and of the technology making inexplicable decisions and being used for surveillance. This will obviously have a negative impact on trust in the municipalities – and on social trust.

The municipalities were aware that there might be ethical concerns associated with using artificial intelligence in public services, and that citizens' trust in the municipalities was a prerequisite for the use of the technology. For example, in several cases the municipalities noted that they had to be open and transparent about how they used artificial intelligence if they were to retain citizens' trust.

Artificial intelligence cannot only affect citizens' trust in the administration. Trust is also a prerequisite for developing and using artificial intelligence. The municipalities are ultimately reliant on citizens consenting to disclose their data. If citizens do not trust the municipality, they are less likely to disclose their data.

It may seem as though good preparation and planning are becoming keywords when it comes to municipalities introducing artificial intelligence. Careful consideration of risks is needed when it comes to ethics, legislation and technical aspects.

At the same time, it should be mentioned that artificial intelligence is a versatile technology that can be used in many areas. This report partly concerns areas of use involving the exercise of authority, where the ethical considerations can be difficult. Artificial intelligence can have many applications that are significantly less problematic, for example in the environmental area.

A striking feature of the interviews with the municipalities in this investigation was the similarities in their work with artificial intelligence. Many had begun development projects in the same areas and intended to use artificial intelligence to solve similar problems. But they were not necessarily aware of each other and were not cooperating systematically. That said, they perceived similar opportunities and challenges.

It seemed obvious that cooperation between Nordic municipalities might be sensible. This could lead to a smoother and more effective introduction of artificial intelligence. If the municipalities join forces, they can avoid unfortunate incidents that might have a detrimental effect on trust. They can pool their competencies and work through issues together. We therefore suggest that Nordic municipalities cooperate to:

- regularly share experiences
- develop Nordic ethical guidelines
- conduct joint research and development projects



Introduction

The municipalities in the Nordic regions are quite similar in many areas and it is therefore interesting to look at how selected municipalities introduce artificial intelligence. Administrative traditions across the Nordic region are quite similar, and the public sectors are based on common values such as openness, equal treatment and efficiency. The Nordic region is also more digitally advanced than many other parts of the world, which is why the conditions are good for introducing artificial intelligence here.

In short, artificial intelligence is systems that seem to be intelligent. By analysing data, they can perform various tasks with a certain autonomy.¹ Algorithms are often mentioned in the same breath as artificial intelligence. An algorithm is the rule or recipe – a mathematical formula that describes what the artificial intelligence should do.

Machine learning, which is one of several forms of artificial intelligence, has driven the field forward in recent years. A machine learning algorithm comes up with some of the instructions for what the artificial intelligence should do. These algorithms can learn, and often adjust themselves to be more precise. They generally learn from data. Among other things, larger amounts of data and more powerful computers have led to the development picking up speed.² In this report we focus on artificial intelligence, which includes machine learning.

To understand how machine learning works, we can look to the health sector. There, algorithms can be used to find new correlations and patterns of which humans were unaware. For example, algorithms have calculated which diseases patients risk contracting after being supplied with data on many patients' health. The aim is to provide patients with the best possible treatment. The algorithms can also be instructed to look for something specific, such as melanoma. It trains itself using images of many moles so that it gets better and better at recognising the disease. Tests show that artificial intelligence can be as good at this as doctors.³

Thus artificial intelligence can, in some areas, outperform people. It can be faster, more precise and more consistent. Using large amounts of data, it can find new patterns and correlations that we cannot see. But the technology also has a price; it can be expensive to develop and introduce.

¹ Based on the European Commission's definition of artificial intelligence, see Fact sheet: *Digital Single Market – Artificial Intelligence for Europe*, 2019.

² Norwegian Board of Technology: *Kunstig intelligens – muligheter, utfordringer og en plan for Norge* [Artificial intelligence – opportunities, challenges and a plan for Norway], 2018, page 9.

³ Norwegian Board of Technology: *Kunstig intelligens – muligheter, utfordringer og en plan for Norge* [Artificial intelligence – opportunities, challenges and a plan for Norway], 2018, pages 17 and 29. See also sciencedaily.com *Man against machine: AI is better than dermatologists at diagnosing skin cancer*, 2018 and Esteva et al.: *Dermatologist-level classification of skin cancer with deep neural networks*, 2017, Nature.

The municipalities in the Nordic region are facing many major challenges. These include the climate crisis, a greater need for geriatric care, a growing welfare need and rapid urbanisation. Citizens' requirements for municipal services are only likely to increase in the time to come. It can also be difficult to find competent personnel for many of the services the municipalities are responsible for, for example in the health and social sector.

Artificial intelligence can be used to solve many problems and challenges that the municipalities are facing. The technology allows for great opportunities and the potential is huge. With artificial intelligence, many tasks can potentially be performed faster, cheaper and more effectively. Just over 80 per cent of all Swedish municipalities stated in an investigation that they believed artificial intelligence could be quite or very useful for the efficiency, quality and service of their activities.⁴

At the same time, some ethical concerns and challenges follow in the wake of artificial intelligence. The prevalence of the technology makes many people feel uneasy. People are concerned that artificial intelligence may result in more unemployment, that their data is not being processed securely enough, and that algorithms might result in more discrimination. Another concern is whether private actors may gain a disproportionate influence over the public administration and democratic processes. And could the introduction of artificial intelligence result in a lack of responsibility? Who is responsible when an algorithm makes a mistake?

How these and similar concerns are managed by the municipalities is particularly important in the Nordic region. Trust in the public sector is high here, which makes it possible to have a well-functioning administration.⁵ This lays the foundation for effective solutions and the possibility of implementing long-term reforms.⁶

At the same time, the Nordic societies are based on high levels of social trust, which means that people largely rely on each other. This is positive for both individuals and the social economy. The population's perception of the public administration, for example whether they think it is transparent, fair and effective, is one factor affecting social trust. When citizens rely on

⁴ Vinnova: *Artificiell intelligens i svenskt näringsliv och samhälle – analys av utveckling och potential* [Artificial intelligence in Swedish business and society – analysis of development and potential], 2018, page 60, VR 2018:08.

⁵ For more information on trust in the public administration in the Nordic region, see Andreasson, Ulf. *Tillit – det nordiska guldvet* [Trust – the Nordic gold], 2017, pages 16–17.

⁶ ONR 19:5. New Public Administration Act – Act relating to procedure in cases concerning the public administration (Norwegian Public Administration Act), 2019, page 141, Official Norwegian Reports.

municipalities and the state, they also rely on each other because they know that the public institutions treat them equally.⁷

An important question is thus what consequences artificial intelligence might have for trust in the Nordic region.⁸ There is a lot at stake here. Both the population's trust in the public administration and social trust may be affected. In the longer term, it can be argued that this will have consequences for the entire Nordic social model.

It is usually in communication with the municipalities that citizens encounter the authorities and their views on the public administration are formed. This is one of the reasons we focus on the municipal level in this report.

In summary, these issues are the starting point for this report:

- How do the municipalities in the Nordic region use artificial intelligence today?
- What experiences have these municipalities had?
- How can artificial intelligence affect citizens' trust in the municipalities – and trust in society as a whole?
- What potential is there for a cooperation on artificial intelligence between Nordic municipalities?

This is not another theoretical review of what artificial intelligence may lead to sometime in the future, but a specific study of how selected municipalities are working with artificial intelligence today, what opportunities and challenges the technology is presenting for the municipalities, and what reflections these municipalities have.

⁷ Andreasson, Ulf. *Tillit – det nordiska guld* [Trust – the Nordic gold], Nordic Council of Ministers, 2017.

⁸ Being able to rely on artificial intelligence is also the main line in the European Commission's *Ethics Guidelines for Trustworthy AI*, 2019. There the ambition is to promote "Trustworthy AI".

Method

We have investigated how two municipalities in each Nordic country are working with artificial intelligence. We chose the capital municipality and another municipality that was working on interesting and varied projects. We chose municipalities on the basis of tips from other municipalities or municipal associations, or by Internet search, and not using specific criteria. Our investigation should not therefore be considered mapping of usage across all the municipalities, and we are taking into account that there may be other municipalities that have made greater progress with artificial intelligence.

We have spoken to employees in the following municipalities:

Denmark:

Gladsaxe Municipality

Copenhagen Municipality

Finland:

Espoo Municipality

Helsinki Municipality

Iceland:

Kópavogur Municipality

Reykjavík Municipality

Norway:

Oslo Municipality

Trondheim Municipality

Sweden:

Helsingborg Municipality

Stockholm Municipality

We have also interviewed the associations of municipalities in each country. In the interviews, we have gained an overview of what stage the municipalities are at in the development and discussed topics such as driving forces, ethics and legal issues.

We have interviewed departments working with digitisation or similar in each municipality and the report must be read with this in mind. The employee statements are not necessarily representative of the entire municipality.

We conducted interviews in the period November 2018 to March 2019.



To define a "Nordic administrative tradition" in the chapter where we discuss artificial intelligence and social trust, we have taken the ethical guidelines for government officials in the Nordic countries as our starting point.⁹ Such guidelines contain values – for example equal treatment, integrity and professionalism – that states want their employees to observe. The values can thus be seen as an expression of the countries' administrative traditions.

⁹ The approach is inspired by Rothstein and Sorak's study *Ethical Codes for the Public Administration*, QoG Working Paper Series, 2017. In addition to the ethical guidelines, we have also referred to other sources such as Report No. 19 (2008–2009) to the Storting. *An Administration for Democracy and Community* and the Ministry of Finance of Denmark's *Enklere regler, mindre bureaukrati – lovgivning i en digital virkelighed* [Simpler rules, less bureaucracy – legislation in a digital reality], 2017.

How are the municipalities working with artificial intelligence today?

Overall, the Nordic municipalities have not come that far in introducing artificial intelligence. The municipalities we interviewed have not implemented the technology on a large scale either. To date, the development has been seen more or less clearly in the municipalities' general digitisation strategies.

This situation will probably look completely different in a few years. After all, the municipalities are facing a development that is going to be fast and far-reaching. In some municipalities, it seems that the development of artificial intelligence is now spreading from enthusiastic individuals and departments out into the organisational structures, with a clearer political foundation.

Some municipalities have had a slightly different approach. For example, in Kópavogur, access has been more management-led. They have made decisions and undertaken other preparations to pave the way for increased use of artificial intelligence before actually starting to use the technology.

It may seem that the development of artificial intelligence in the Nordic municipalities is more a human process than a technical process. Our impression is that it is primarily the employees' and politicians' competence and attitudes that hold development back – not the technology.

In the rest of this chapter, we describe what the municipalities we interviewed were using artificial intelligence for, and what opportunities and ethical challenges they perceived for themselves. The chapter is structured according to how advanced the use of the technology is. We will start with uses that are simpler and ethically less problematic and finish with uses that are more ambitious and complex.

Simpler tasks – sorting post, forwarding calls and chat bots

Several municipalities had started using artificial intelligence for what we might consider simpler tasks. Algorithms put callers through to the correct case officer and sorted incoming post, and chat bots responded to citizen enquiries. These technologies involved an element of machine learning, prompting us to include them in our investigation.

Many municipalities had also started using robots, so-called RPA (Robotic Process Automation). These robots performed repetitive tasks based on clear instructions prepared by humans. We have not included RPA that does not use machine learning in this report.

A form of artificial intelligence that many municipalities in the Nordic region had implemented was chat bots. A chat bot appears as a chat window on the municipality's website. Citizens can ask it questions about the library's opening hours, for example, and get an answer without the involvement of a human. Many municipalities in Norway have started using "Kommune-Kari"

(Municipality Kari). She can respond to citizens directly in the chat or link them to a website with the requested information.

Copenhagen Municipality said that they were using artificial intelligence for some other tasks in this category. Artificial intelligence put people who called the municipal switchboard through to the relevant people in three different groups of employees. The algorithm put the callers through based on the background data on the citizen (gender, age, marital status) as well as previous tax requirements and reminders for the citizen. The employee who picked up the phone automatically received information on the citizen in a pop-up window. Copenhagen Municipality was also using artificial intelligence to sort incoming post and emails, with the algorithm analysing the text in the letters and emails. The municipality was also developing an algorithm to help citizens find available parking spaces.

Helsinki Municipality had started to develop a similar algorithm. It was intended to sort written enquiries from citizens to the municipality using text analysis. Helsinki said that using artificial intelligence for this was relatively common and that several cities in the Netherlands were working on the same thing.

Using artificial intelligence for these tasks could reduce the time human employees spend doing it manually. Helsinki Municipality told us that employees spent a lot of time sorting enquiries for the municipality – time they could spend on other tasks if the algorithm could lighten the workload.

Although the use of artificial intelligence for these tasks does not seem to raise major ethical concerns, such considerations were still required to an extent. For example, Copenhagen Municipality thought there was a need to make sure the automatic forwarding of enquiries did not affect the processing of the case in an unfortunate manner. We can only speculate as to future developments, but if the distribution of the algorithm in any way influences the further processing of the case, for example by giving the case officer a biased view of the citizen that contributes to unreasonable discrimination, this is obviously problematic.

More complex use: Planning services and case management

Many of the municipalities had tested whether artificial intelligence could be used for more complex tasks. They had tested whether artificial intelligence could assist the employees in the municipality with case management, or be used to plan the municipality's services better. An example of the latter was an experiment that Espoo Municipality had recently conducted.

Service planning

Espoo Municipality had investigated whether it could use artificial intelligence to improve the services at an overall level. The municipality wanted to be able

to plan its services better, and in particular it wanted to do better in terms of taking earlier action to help vulnerable citizens.

The experiment consisted of two projects. In the first, the municipality had tested whether an algorithm could calculate how citizens' health would develop in the future. The algorithm divided the population into twenty different segments based on their health status and calculated the likelihood of citizens moving between the groups. It could factor whether the citizens were receiving services from the municipality into the calculation. In the second project, Espoo wanted to know more about why children had found themselves in a situation where they received help from the child welfare service. The municipality developed an algorithm that identified 280 risk factors. In future projects, they wanted to calculate the factor combinations that increased the likelihood of children receiving help from the child welfare service. This was to be done in cooperation with the social workers.

The experiments were finished and the municipality thought it had been successful. The results showed that it was actually possible to use artificial intelligence to plan the municipality's services better. The municipality said the project was ground-breaking, among other things because the algorithms learned from data from several different sectors in the municipality. The municipality had deleted all the data after the experiment and was now assessing how the project could be further developed.

The data Espoo used was anonymous and the municipality had not planned for the technology to be used in the processing of individual cases. It is conceivable that the algorithm will be able to alert a case officer when a citizen is at high risk of needing help from the child welfare service. Espoo was open to assessing such usage in the future, but it was not on the cards when we interviewed them. They thought that such use of the algorithms would be perceived as too controversial and that it would potentially not be legal under the General Data Protection Regulation (GDPR).

Advisory case processing

Many of the municipalities we talked to had tested how they could use artificial intelligence for what we in this report refer to as "advisory case processing". The algorithms were to advise the case officers when a new case was to be processed so that the case officers were able to make better decisions and work more effectively.

This was something several municipalities thought would be useful in the future. Espoo Municipality envisaged case officers in the future using artificial intelligence as decision support, like we have previously used calculators.

One way of using artificial intelligence for case processing advice was when a new case was to be processed, the artificial intelligence would inform the case

officers of how similar cases had been processed previously. The algorithm would search for similar cases in the archive and show these to the case officer. For example, in Trondheim Municipality, a proof of concept was created for such a project where the objective was to improve case management at the Norwegian Labour and Welfare Administration.¹⁰

In this way, artificial intelligence could help share experience and knowledge in the organisation. One person we interviewed thought that inexperienced case officers are often less flexible than more experienced case officers, who are better at showing discretion in complicated cases. Giving inexperienced case officers information on how previous cases were resolved and the rationale for the decisions could help ensure that they process the cases more in line with established practice in the organisation.

Artificial intelligence could thus reduce unreasonable differences in case management. When the case officers see how previous cases were processed, they can use this as a basis. At the same time, it should be noted that artificial intelligence only recognises patterns and finds similar cases. It does not find cases that were better processed than others, only cases that are similar.

Some municipalities were working with using artificial intelligence to make a preliminary assessment of how individual cases should be resolved. The idea was that the case officer would be able to use the assessment as a basis. Copenhagen had developed an idea for an algorithm that would provide suggestions for the case officer on how to resolve cases involving planning applications. The municipality also had plans to look at whether artificial intelligence could calculate how effective various measures would be for helping unemployed citizens find work. Perhaps further education would help? Or gaining experience in a workplace? The calculations would be based on what had helped in similar cases in the past and give the case officer a better foundation for helping each individual.

Several others had launched test projects on how artificial intelligence could support case officers. Oslo Municipality had investigated how well artificial intelligence could process applications for liquor licences from bars. The municipality had also tested the technology on the processing of complaints about parking tickets. They encountered some challenges during the tests such as there not being enough data and the artificial intelligence not explaining well enough why it had assessed the case as it did.

Local Government Denmark had assembled five to six municipalities for four to five months to investigate what tasks it was most appropriate to use artificial intelligence for and had developed a proof of concept for two algorithms. One was in the social area. When employees use force on people

¹⁰ Proof of concept: A prototype or demo version to demonstrate that something is feasible in practice.

in institutions, they need to report and describe the incident, and the social security authority must then assess whether the use of coercion was legal. The project was intended to investigate whether the algorithm could act as decision support for the experts assessing the incident descriptions. Local Government Denmark was also developing an algorithm that would assist the case officers in assessing whether to penalise citizens with ordinary capacity for work that missed meetings with the job centre. When we interviewed Local Government Denmark, they were assessing how to use the results in the future. Thus far, the success rate of the algorithms had been too low to put them into operation. Local Government Denmark told us that the municipalities were therefore conducting a number of artificial intelligence projects where already developed algorithms were to be developed and a number of algorithms were to be tested to clarify what was required to start using them.

Local Government Denmark told us that it is complex, detailed and time-consuming to develop algorithms for these types of tasks. They had to constantly adjust and assess how the algorithm was working and remove irrelevancies, such as individuals' names influencing case outcomes. They told us it is only when you start developing algorithms that you realise how demanding it actually is. As such, they thought it could be advantageous for the municipalities to cooperate on artificial intelligence, and they said that there were already indications of municipal cooperation in the area.

A condition many pointed out for artificial intelligence to be able to advise case officers was it being clear why and how the algorithm had made its assessment. This is the so-called "black box problem" that is often cited in connection with artificial intelligence: it is not clear how artificial intelligence achieves its results, and thus the rationale is not clear either. Some told us they had ended projects precisely because they had not succeeded in this, as Oslo Municipality mentioned above. The developers considered this a technical issue that was manageable.

Another potentially concerning development that some pointed out was whether artificial intelligence could affect the case officers' attitude and approach. Questions were asked as to whether artificial intelligence could render the case officers passive. There was some concern that the case officers were becoming less and less critical of the advice from the algorithm, thus ending up in a situation where in reality it was the algorithm making the decisions.

Automated decisions

It is easy to imagine taking the use of artificial intelligence in this area a step further by eliminating the human case officer from the process and letting artificial intelligence make decisions on its own. We call these automated decisions.

When we talk about automated decisions, it is important to be sure which decisions we are referring to. As we have seen, several municipalities already let artificial intelligence make automated decisions in relatively uncontroversial areas where people previously made the decisions, such as sorting incoming post or putting people calling the municipality through to the most relevant case officer. Or they let chat bots answer questions from the general public without a human intermediary.

At the same time, it is easy to imagine that artificial intelligence could be used to make more complex decisions than these – decisions that currently require human discretion and that have significant consequences for citizens. Examples include decisions about who should receive social security benefits and decisions about planning applications.

None of the municipalities we talked to had reached a point where they were testing this kind of automated decision-making. Several thought this was something that would have to be considered in the near future and that society should assess whether this was something it wanted, and if so how it should be implemented. Some municipalities were more sceptical than others. Trondheim Municipality thought that artificial intelligence should only make automated decisions in wholly uncontroversial cases and that the technology would mainly be used as decision support.

Artificial intelligence as a basis for taking early action

So far, we have seen how artificial intelligence is used for simple tasks such as sorting enquiries and chat bots, and how municipalities can use the technology as an aid for processing existing cases. In these instances, the idea is that the technology is used for cases that would have arisen regardless of whether artificial intelligence was used or not. But artificial intelligence can also be used proactively – to take action early without any existing case or any problem being reported. One of the strengths of the technology is that it can calculate the likelihood of future events.

There is a distinction between doing something based on the calculations of artificial intelligence when it comes to technical systems and when it comes to people. The former does not normally pose ethical issues. Several municipalities used artificial intelligence on technical systems. Stockholm Municipality used algorithms to predict where in the water and sewer system the next leak would arise and thus perform preventive maintenance. In Helsinki, they tested whether weather forecasts could guide snowploughs so they were sent out in areas where there was likely to be a lot of snow, while in Oslo they assessed whether artificial intelligence could predict that a refuse collection truck would not manage its entire route, thus prompting another refuse collection truck to be sent out.

Artificial intelligence can also be used proactively in matters relating to people, at different levels. Both Oslo and Helsinki had expressed a desire

to develop proactive digital services. Helsinki Municipality was developing a digital strategy where one of several objectives was for Helsinki to become a proactive city. For example, the municipality would suggest a school for parents when their child was approaching school age instead of the parents having to look for information themselves. Artificial intelligence was intended to be a key component of this project. Oslo Municipality was working to identify a vision of a data-driven and proactive city with the citizen in focus.

Gladsaxe Municipality had attempted to develop an algorithm that would identify children at risk of having social issues so that the municipality could take action early before the issues became more serious. The advantage of the algorithm was the overall perspective. It could combine data from multiple sectors and get a bigger picture of the child's situation. The municipality envisaged the algorithm finding children who were inadvertently overlooked by the expert advisers. In other words, the algorithm would supplement the methods the municipality already had, as the expert advisers were better at identifying socially vulnerable children in their sectors.

When the algorithm identified a child, a specialist adviser would assess the case. If the expert adviser believed that the municipality should proceed with the case, the family would be contacted and offered help from the municipality. If the family declined, the municipality would leave them be. Gladsaxe stressed that they would not intervene in a family based on the algorithm's calculations, but instead offer help, as they were fully aware that the project could be perceived as controversial. Gladsaxe was also aware that the model raised several ethical questions, but pointed out that one of these was: if the municipality can use such an algorithm to identify children and help them at an early stage, before their problems escalate, is it not right from an ethical perspective to take that opportunity?

At time of writing, Gladsaxe had not started using the algorithm. The municipality did not have the requisite legal authority and it had not received the necessary permissions from the government. The experiment has garnered national attention in Denmark and caused many strong reactions, including accusations that it constitutes surveillance. But the experiment has also helped some people find ways of improving the preventative services. In 2018, the then Cabinet of Denmark considered amending the legislation so that municipalities in Denmark could combine data on families with children and children in general, but this was eventually scrapped.¹¹

¹¹ See Politiken's articles from 2018: *Regeringen har lagt sin plan om overvågning af børnefamilier i skuffen* [The government has shelved its plan for monitoring families with children] and *Gladsaxe indstiller arbejdet med omstridt overvågning af børnefamilier* [Gladsaxe stops work on disputed monitoring of families with children].

As mentioned in the previous subsection, Espoo Municipality had developed an algorithm that could calculate the likelihood of how citizens' health would develop in the future and what combinations of risk factors increased the likelihood of children receiving help from the child welfare service. The municipality's objective was to improve the municipality's services at a structural level. It would have been possible to use the technology to take preventive measures to assist families who had not yet been in contact with the child welfare service, but rather with other services in the municipality. According to Espoo, using the technology for this purpose was not on the cards – for political and ethical reasons. Neither was it something the municipality deemed necessary; the municipality was focusing on other uses of the technology.

Another example of proactive use of artificial intelligence was a project in Trondheim Municipality. They were working on an algorithm that would calculate which companies were likely to become insolvent. The purpose was to follow up more closely with companies at risk and weed out rogue actors earlier. They told us that according to the literature in the area, insolvency could be predicted a year in advance with approximately 80 per cent accuracy based on five simple economic parameters. However, since this means a mistake is made in every fifth case, the chief municipal treasurer thought this should be increased to at least 90 per cent. The municipality looked at the possibility of including more parameters to mitigate this. It had been in dialogue with relevant actors to obtain all the necessary data sets but had not yet begun in earnest.

In this chapter, we have seen that the municipalities had started working with artificial intelligence. They were mostly at a level where they were developing and testing the technology. They saw great possibilities but also faced several challenges along the way, which only became clear once they had started on the work to develop algorithms. Several municipalities were working on using the technology for relatively simple tasks. There were also some who tested more advanced use, such as how it could be used as support in case management that currently requires human judgement. The proactive use of artificial intelligence illustrated an important dividing line between the use of artificial intelligence in technical areas and in cases concerning people. The former involves significantly fewer ethical issues than the latter.

Some selected experiences

The municipalities we spoke to had some experience of working with artificial intelligence. In this chapter, we focus on two areas that may be useful for other municipalities following in their footsteps.

Relationships with private actors

The municipalities we spoke to had slightly different approaches to the interaction between the municipality and the private suppliers. Some municipalities employed their own people to develop the algorithms. For example, Oslo Municipality was working to build a competence environment so that the municipality was less dependent on the supplier market. Other municipalities used a system of procurement from private suppliers.

In Helsingborg Municipality, they had developed a special method for developing artificial intelligence as a resource in the municipality. Through a municipal accelerator, "HGB Works", they tried to get projects from idea to reality quicker. "HGB Works" was both a physical space and a function that offered development support to the different parts of the municipality. Companies could participate in the accelerator as long as they accepted open innovation, meaning that what they created became widely available.

The private companies were key to the success and it was important that the interaction worked. Some emphasised the development of the "ecosystem" in the municipality, i.e. research institutions, the public sector and private companies. Espoo Municipality told us that their experiment to test artificial intelligence was a success not only because it gave positive results but also because the company that developed the algorithm, which had its head office in Espoo, estimated that they had hired 14 new employees as a result of the project.

The development of artificial intelligence is currently dominated by a few American technology companies such as Apple, Facebook, Google, IBM and Amazon as well as some Chinese companies such as Tencent, Alibaba and Baidu. These companies could have a major impact on social development in the Nordic region, not least because they have a big head start in terms of developed solutions and ecosystems. One might ask how Nordic public actors are to relate to these companies as they operate and have their foundation in different cultures and have different management and organisational traditions.

Several of the municipalities raised some issues that they thought it sensible to be aware of when working with private actors. These concerned, among other things, who would own the data and algorithms when they were fully developed and how to avoid being too dependent on the private suppliers. This raises some important questions: should technology companies develop algorithms based on free use of public data and then sell the algorithms to public actors? Who will own the algorithms after they are fully developed?

An example of a municipality that had reflected on this was Helsinki. The municipality was not developing its own algorithms, but cooperating with both smaller and larger companies. Among other things, they used Microsoft's cloud solutions. They had been considering how to use the large companies' solutions and technologies without being too closely associated with these and developing a dependant relationship with them. They pointed out that you could end up in a situation where the private suppliers owned the data that initially belonged to the municipality, if the companies had processed the data. And that was something that had to be avoided.

Several informants stressed the need to ensure that the algorithms belong to the municipalities after they have been developed, or that they become available as open source codes. This is ensured by way of procurement processes. In the interviews, it was pointed out that some municipalities do not currently have the necessary competence to implement these in a satisfactory manner. But this was something they were working on. Reykjavík said that they wanted to build a team that would have the necessary competence to procure and develop good artificial intelligence solutions.

Cross-sector data sharing

In many cases, a key requirement for artificial intelligence is access to data. Data can be roughly divided into data created by people, such as administrative and financial data, and data recorded by various types of sensors, by physical environments and by people.

For most municipalities, the question is whether the data is good enough for developing artificial intelligence. Data generally needs to be processed and clarified, and a key part of the upcoming work for the municipalities is standardising the data.

Several municipalities we talked to said it was generally a challenge that data was divided into several sectors in the municipalities. They were working on making it possible to use this data across sectors to develop good algorithms. But combining the data could be challenging. In Espoo Municipality, they found this to be the most difficult thing when they conducted their experiment. Each sector had its own computer system and it was difficult to combine the data from different systems. It was also challenging that the data sets were sensitive and that the municipality had high standards for data security.

Several municipalities we interviewed deemed artificial intelligence to be something that had a bearing on the entire municipality's operations, rather than a sector-specific thing. We saw signs of a development that has not yet come to fruition, namely that artificial intelligence may affect the organisational structure of the municipalities – not only as a result of artificial intelligence, but also as part of the digitisation as a whole.

More specifically, this has to do with how the municipalities have traditionally been organised in silo structures where the various units have specific and limited areas of responsibility. Several municipalities we spoke to wanted digital integration across silos.

Data being coordinated between multiple sectors and units being more closely linked is particularly prominent in the "smart city development" taking place in many places. A "smart city" optimises the management of traffic, public transport, logistics and other services to achieve lower energy consumption and emissions, reduce costs and achieve greater comfort. Artificial intelligence is an important part of the development. It can balance the electricity grid or the traffic flow and adjust heat consumption, ventilation and lighting. Communication between these components is important in the smart cities. People are also starting to discuss whether to build up systems to provide better services to citizens within, for example, the healthcare industry.

Digitisation leading to reintegration into the public sector is something that is discussed in the academic literature.¹² There it is argued that digitisation in the public sector involves an element of reintegration of what are now divided and fragmented organisations, which in turn are a result of New Public Management. The reintegration may involve a strong element of centralisation. The authors see the development as positive and think it has the potential to create a more integrated, holistic and flexible state apparatus.

¹² Dunleavy et al.: New Public Management is Dead – Long Live Digital-Era Governance, *Journal of Public Administration Research and Theory*, 2005.



Artificial intelligence and Nordic trust

Artificial intelligence will, by all indications, have a profound effect on the Nordic societies. Many people believe we are facing a change as significant as when electricity first started being supplied to more households.

In this chapter, we look at how the introduction of artificial intelligence in the Nordic municipalities may affect Nordic trust. To do this, our starting point is how artificial intelligence can strengthen or weaken some of the most important values in the Nordic administrative tradition, values that constitute the foundation of citizens' high degree of trust in the authorities.

It is positive in itself that the population of the Nordic region has so much trust in the public administration. This makes it possible to have a well-functioning administration and lays the foundation for effective solutions and long-term reforms. Social trust, the fact that people largely rely on each other, is also high in the Nordic region and this is beneficial. Social trust can be considered the lubricant in the social machinery. Without trust, the machine would eventually grind to a halt and have to be replaced.

These two forms of trust are connected. Many researchers have pointed out the importance of public institutions for the existence and maintenance of social trust. The state being transparent, effective, fair and so on means we dare to trust each other in the Nordic region. In corrupt societies, "poor" behaviour often leads to success, which means individuals in such societies tend to have a very individualistic approach. In theoretical terms, you might say that individuals go from being responsible citizens to "freeloaders".

Therefore, the question of how the introduction of artificial intelligence in the Nordic municipalities might affect the population's trust in the municipalities and thereby also the social trust is crucial.

All the municipalities were aware that there could be ethical issues associated with using artificial intelligence, which in turn could affect trust. Several of them had therefore started to develop artificial intelligence in the areas they deemed least ethically problematic.

Legislation and openness

Legality is a fundamental value in a democratic state. What the authorities do must be supported by laws or regulations. If the public administration violates the legislation and this is not perceived as legitimate by the population, this may have a negative impact on trust in the authorities.

Good legislation can protect individuals' rights when artificial intelligence is introduced, for example by allocating responsibility in cases where artificial intelligence causes harm to humans.

There are now several laws and regulations at different levels that have an impact on the development and use of artificial intelligence. The EU's new

General Data Protection Regulation (GDPR) is particularly relevant. Among other things, the regulation restricts the development of individual profiling and automated decisions, which has consequences for the development and use of artificial intelligence.¹³

Some of the people we interviewed were of the general view that legislation and how it is interpreted hindered innovation and development in some cases. For example, one informant thought that there should be more focus on doing "the right thing" than on doing "things right". One conflict expressed in the interviews was between those developing artificial intelligence in the municipalities and the lawyers, who according to developers tended to be uncertain of the legality of the new initiatives and therefore often "said no". Some thought there was a need to adapt the legislation to the new technology.

At the same time, there is also a concern that digitisation and artificial intelligence will lead to changes in legislation rather than the legislation providing the framework for the development, for example if issues with the legislation come to light after developing artificial intelligence. In many cases, it may be reasonable to be pragmatic and change the legislation in such situations because the artificial intelligence is very useful and the legislative changes are not particularly problematic. But it is important to be aware that something fundamental in the Nordic democracies is then affected, namely the parliament adopting the laws. If laws and regulations change significantly to adapt to technology, power is taken from elected officials and given to civil servants and technology developers.

Openness and transparency are crucial elements of the Nordic democracies. What the administration is doing should not be a secret unless necessary. The population should be able to familiarise themselves with what is happening in the public sector and how it works, and have the opportunity to scrutinise it. An open administration is not only a prerequisite for democracy; it counteracts corruption and negative culture. And not least an open and transparent public sector builds trust between the population and the administration.

In several cases, the municipalities themselves stressed how crucial it was that they were open about how they used artificial intelligence if they were to retain the trust of citizens. They had to show the citizens what they used the technology for, why they were using it and how it was being used. Espoo Municipality thought this would be the biggest challenge of artificial intelligence. The citizens would have to be told what the algorithms were used for and why they were being used. The municipality thought it pertinent to avoid a situation where algorithms are used in the background without the citizens being aware of it. Otherwise, the population's trust in the public sector was at stake. In Kópavogur Municipality, they were generally aware of

¹³ Norwegian Data Protection Authority. *Hva er nytt med personvernforordningen?* [What's new with the General Data Protection Regulation?], 2019

transparency and openness. They said that they had worked a lot with it and that it had given the municipality a good public image.

The “black box problem” is often cited in connection with artificial intelligence – it refers to having trouble explaining how the algorithms achieve the results they do, often because the algorithms are very advanced and complex. Several municipalities mentioned how important it was to explain to the citizens how the algorithms work and what they are used for. But there is no easy answer to how well citizens should understand how artificial intelligence works and at what level of detail.¹⁴ In Espoo, they thought that most people would not understand how the algorithm works but have to be informed of what the algorithms are being used for. They compared it to a car: few people are familiar with the technical and mechanical functions, but everyone knows what cars are used for.

The municipalities were aware of these issues and working to develop understandable algorithms. Not least, it was a prerequisite for the case officers to be critical of the advice they were given.

If the municipalities introduce artificial intelligence that is not transparent and understandable, this causes several problems, which are discussed in the literature on artificial intelligence. Among other things, it can reduce the capacity of citizens to understand why the public sector acts as it does.

In continuation of the above, it seemed very important that the municipalities kept citizens informed of how they were using artificial intelligence. If artificial intelligence is a decision support and one of several tools that the case officer uses, and which is assessed critically, and the municipality is successful in clarifying its purpose, the technology may seem less intimidating than if people are given the impression that it is almost autonomous.

Equal treatment

The principle of equal treatment is essential to the Nordic state administrations. Equal cases should be treated equally. The public sector should be fair and not discriminate without good reason. The authorities must not take arbitrary considerations or make unreasonable decisions. For example, citizens must not experience discrimination on the basis of gender or ethnicity. This is a prerequisite for maintaining trust in the municipalities.

¹⁴ The issue of transparency and artificial intelligence is very nuanced. For commercial developers, how the algorithms work might be a business secret. See chapter 4 in Larsson et al.: *Hållbar AI – Inventering av kunskapsläget för etiska, sociala och rättsliga utmaningar med artificiell intelligens* [Sustainable AI – Inventory of knowledge of ethical, social and legal challenges of artificial intelligence]. AI Sustainability Center, 2019.

Based on our investigation and the discussion about artificial intelligence taking place in the public sphere, it seems that artificial intelligence might help the municipalities treat citizens more equally than they do today, but that the technology might also result in more unreasonable discrimination.

As we saw earlier in the report, artificial intelligence can facilitate more equal treatment. Algorithms can ensure that case officers are aware of how past cases have been resolved so that the case officers can use this as a basis, and this can lead to the organisation as a whole resolving cases more uniformly. If artificial intelligence is also used to give case officers advice and provide preliminary assessments or even make decisions, it can contribute to even more equal treatment since algorithms cannot commit human error and do not have biased attitudes or sympathies.

But this is not as simple as it sounds, and it is a complex field. Not all case officers process all cases in the same way. A lot is about interpretation and discretion. This prompts the question: which case officer should artificial intelligence learn from? It should also be noted that artificial intelligence only recognises patterns and finds similar cases. It does not find cases that were better processed than others, but only cases that are similar.

In the discussion about artificial intelligence, a concern often raised is that artificial intelligence may discriminate. Copenhagen Municipality thought it should be ensured that the automatic distribution of enquiries did not affect the processing of the case adversely. This is a relatively innocuous example. There are examples of algorithms perpetuating biases inherent in the data they use. The data may, for example, lead to one gender being treated better than the other. Few of the municipalities addressed this issue, but it is something that should be kept in mind.

Better service and enhanced efficiency

The public sector manages major resources in the form of community funds. Therefore, it is crucial to the Nordic administrations that the funds are used effectively. Another important value is that the municipalities should provide good service to citizens for these funds. Efficiency in the public sector is particularly important considering the population of the Nordic countries is ageing and the costs of elderly care are increasing. Efficiency in the municipalities also increases trust among the population, who rely on their tax money being used sensibly.

The municipalities we spoke to mainly noted two rationales for introducing artificial intelligence: being able to offer citizens better services and saving money. These two rationales were not mutually exclusive and often linked: offering better services, such as preventative services, could also save money.

For several of the municipalities, the economic aspect was one of the key rationales for developing artificial intelligence. Trondheim Municipality had a

goal that even if the municipality grew in future, and this put pressure on the its services, it would not lead to an increase in the number of public servants. Artificial intelligence was intended to be one of the tools the municipality used to succeed in this.

Because artificial intelligence outperforms people in many areas, including by being faster and able to manage large amounts of data, the potential for streamlining services is obvious if good solutions are developed. Some informants talked about how the processing time for certain tasks could be reduced from 30 days to one.

We were told that it can be difficult for those developing artificial intelligence to argue for such projects from an economic perspective. The projects often involve building competence without immediate or visible benefit, at least in the short term. The costs could be offset against additional personnel resources, often in the same sector for which artificial intelligence was being developed.

At the same time, there was of course an element of financial risk. Many of the municipalities were experimenting with artificial intelligence and some of the algorithms perhaps would perhaps not be used. Several municipalities we spoke to had scrapped algorithms for various reasons. One had wondered how many years of expertise could have been employed for the money they had spent developing an algorithm that potentially could not be used. These discussions lead on to the bigger question of the role the municipalities play in developing artificial intelligence. To what extent should they lead the way and take financial risks to improve and streamline?

Another issue is how the development will affect the workforce – reflecting the general concern that artificial intelligence will lead to large parts of the population being made redundant. Several municipalities we interviewed did not consider artificial intelligence a threat to employees' jobs, at least not in the foreseeable future. It was more about an interaction where people will contribute with common sense and human warmth.

On the other hand, the concern could not be dismissed. In Helsinki Municipality, they considered how employees whose work tasks could be replaced by artificial intelligence could be taught to perform other tasks and how feasible it would be.

As we have seen in the previous chapter, it is possible to use artificial intelligence proactively – to look up citizens or to improve technical systems without there being a case or any problem having been reported. This is one of the strengths of the technology: it can calculate the likelihood of certain events in the future based on large amounts of data.

It seems obvious that a preventive use of artificial intelligence could improve the municipalities' services and reinforce a core value in the Nordic

administrations, namely the public sector providing good service: services delivered efficiently with high quality. A municipality that provides good service will thus maintain and increase citizens' trust. The municipalities can probably also save money by intervening early and dealing with the problems before they are exacerbated and therefore more expensive to resolve.

Several municipalities were working on preventive artificial intelligence and technical systems. Some municipalities could already estimate where the next leak in the water and sewage system would occur and thus maintain the system more efficiently. Several had developed "smart city concepts" where it was possible, for example, to improve the traffic flow based on how it has been previously. As more sectors and data are linked together, the municipalities can increase the complexity and improve the services even more.

The proactive use could simplify citizens' lives and interactions with the municipality. As we have seen, several municipalities were working on being "proactive" municipalities that would provide services to citizens before they asked for them.

The technology can also be used to identify people in order to take proactive measures. A municipality had plans to develop a model that could find vulnerable children earlier than would otherwise have been the case. It thought it would be better for the families and not least for the children. At the same time, it is this use of artificial intelligence that has caused the most unease and concern. The limits of something fundamental to the Nordic societies are being pushed, and critics have suggested this is almost a form of unwanted surveillance.

This sheds light on issues that must be addressed and questions that have not yet been answered. What will people in the Nordic region think about being contacted by public authorities because an algorithm has pointed out that they are at risk of an undesirable development? Citizens may consider the offer of early assistance as a good service from the municipality. But they might also consider it an unfair and disturbing encroachment on their personal lives. If the latter becomes the case, trust in the municipalities will be negatively impacted. Here the success rate of the algorithms is crucial. As we have seen, the precision of the algorithms varies. Among other things, it depends on the data amount and quality. It seems clear that the municipalities need to carefully consider, plan and assess both the ethical and legal aspects before they embark on this path.



Summary and recommendations

By and large, the municipalities we interviewed had not come that far with artificial intelligence. They were either planning how to use the technology or testing it. Some of them had started using it in some areas. At the same time, it was clear that the municipalities perceived the potential and that development would accelerate in the future. The municipalities had two main rationales for starting to use the technology: they wanted to offer their citizens better services and to operate more effectively. These rationales were often linked.

Some municipalities used artificial intelligence for less complex citizen-facing tasks such as sorting citizen enquiries or answering questions using chat bots. Several had tested whether the technology could be used as decision support in more complex case processing, including in processing planning applications and in the labour market, but none had started using artificial intelligence to do this yet. None of the municipalities had taken what one might consider a next step: developing artificial intelligence to make decisions on their own in complex matters that generally require significant human judgement.

One of the strengths of the technology is that it can anticipate problems and be used as a basis for taking early action. This can be done to achieve very different aims, which in turn have consequences for the ethical issues that should be taken into account. A couple of municipalities were using artificial intelligence to prevent leaks in the water and sewage network. At the same time, other municipalities had tested whether the technology could be used to identify people or businesses at high risk of undesirable development so that the municipality could take action at an early stage. However, the latter use had not yet been implemented.

Two experiences the municipalities had are worth highlighting. One concerned the municipalities' relationships with private actors, including who would own algorithms developed and the data used. The second concerned the municipalities perceiving challenges in the fact that data was divided into silos in different sectors. They were working to integrate the data. It seemed as though this could lead to a centralisation of municipal activities.

The discussions in this report show that when the Nordic municipalities start using artificial intelligence, it may have both a positive and a negative impact on trust in the public administrations. In continuation of this, the social trust of the Nordic societies could also be affected. The introduction of artificial intelligence may improve the municipalities' services for citizens by increasing the efficiency, equal treatment and service of the Nordic municipalities' work. The municipalities can also be perceived as open as to why and how they are using artificial intelligence. If they succeed in this, it may increase the population's trust in them. However, this requires the municipalities to proceed in an appropriate manner. If they do not, there is a risk of the use of artificial intelligence being perceived as weakening the principle of equal treatment

and democratic governance mechanisms, and of the technology making inexplicable decisions and being used for surveillance.

All the municipalities were aware that there could be ethical issues associated with using artificial intelligence in public services, and they had reflected on various issues. Citizens' trust in the municipalities was a prerequisite for the use of the technology. For example, in several cases the municipalities themselves noted how crucial it was that they were open and transparent about how they used artificial intelligence if they were to retain citizens' trust.

At the same time, it should be mentioned that artificial intelligence is a versatile technology that can be used in many areas. This report has partly focused on areas of application where the ethical trade-offs, such as identifying people at high risk of undesirable development, are difficult. As the report has shown, artificial intelligence can have many applications that are significantly less ethically problematic because they are more technical and do not really involve the exercise of authority.

It may seem as though good preparations and planning are keywords. Thorough assessments of ethics, legislation and technical aspects are required. Including legal advisers early in the projects is very important. The technical competence must, of course, be in place. Good preparations and careful planning may prevent unfortunate incidents. If there is a lot of negative attention from the public about how municipalities are using artificial intelligence, this can have a negative impact on citizens' trust. Data security failures and data leaks, which have occurred several times in the Nordic region, are examples of something that must be avoided.¹⁵ If the population perceives that the municipality is working on something that is too controversial, whether ethically or legally, this may also lead to it having less trust in the authorities.

It is also important to continuously assess whether the artificial intelligence is working correctly and fairly and not having unintended consequences.¹⁶

Artificial intelligence might not only affect trust between citizens and the administration. Trust is also a prerequisite for developing and using artificial

¹⁵ Among other things, see the Norwegian Broadcasting Corporation (NRK) articles *Datainnbrot hos Bergen kommune – fryktar at personinfo til 35.000 er spreidd* [Data breach at Bergen Municipality – fears that personal data of 35,000 people has been leaked], *Sensitive dokumenter var tilgjengelig – dette er noe av det NRK fant* [Sensitive documents were available – here is some of what NRK discovered] and *Flere kommuner stengte innsynsmulighet etter NRKs avsløring* [Several municipalities deny access to data following NRK's disclosure] and the Sveriges Radio article: *Hundratals personuppgifter läckta efter IT-brist hos Stockholms stad* [Personal data of hundreds leaked following data breach at City of Stockholm].

¹⁶ For a report on how to implement this, see Reisman et al.: *Algorithmic Impact Assessments – A Practical Framework for Public Agency Accountability*, AI Now Institute, 2018.

intelligence. The municipalities are ultimately reliant on citizens consenting to disclose their data. Artificial intelligence is generally trained using data. If citizens do not trust the municipality, they are less likely to disclose their data. And if too many people do not, the project will collapse.

In continuation of this, another issue that will become important in the future has been recognised, namely the trade-off between the data required and the population's right to decide what data they want to share.

A striking feature of our interviews was the similarities in the various municipalities' work with artificial intelligence. Many had begun development projects in the same areas and intended to use artificial intelligence to solve similar problems. They nodded in recognition when we told them what other municipalities were working on, but they were not necessarily in contact with each other and were not cooperating systematically. That said, they perceived similar opportunities and challenges.

Considering how similar the municipalities in the Nordic region are in terms of administrative culture, structure, digital maturity and how much trust the population has in them, it seems obvious that cooperation would make sense.

Also because the competence to develop and start using artificial intelligence naturally varies between municipalities depending on the resources available. It makes sense for the bigger municipalities to lead the way. At the same time, it is important that the small municipalities also benefit from the technology. Cooperation between municipalities, or a network, therefore seems sensible. This could help improve the knowledge and competence even in the smaller municipalities.

Cooperation between municipalities in the Nordic region could lead to a smoother and more effective introduction of artificial intelligence. If they join forces, they can avoid unfortunate incidents that might have a detrimental effect on trust. They can pool their competencies and work through issues together.

We suggest that Nordic municipalities cooperate to:

- **Regularly share experiences** through, for example, network meetings or Nordic conferences. Several of the municipalities we spoke to expressed a lot of interest in this. They were curious as to what the other municipalities in the Nordic region were working on and whether they could learn from them.
- **Develop Nordic ethical guidelines** for using artificial intelligence in public case management and exercising authority, among other things. Several were already working to develop ethical guidelines. Considering the Nordic countries have a lot in common such as similar values, administrative culture and high levels of trust, it makes sense to have joint ethical guidelines. By combining competencies and resources, thorough and lasting work can be done in the field that can also put the Nordic region on the map in this area.
- **Conduct joint research and development projects.** Several municipalities were working on similar projects. It seems appropriate to pool the resources. For example, the municipalities could work together to develop solutions for artificial intelligence so that the risk and costs are shared.



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Municipalities in the Nordic regions are working to adopt artificial intelligence. Chat bots answer questions from citizens, algorithms can predict leaks in the water and sewage network, and tests are being conducted to determine how the technology can advise and support the municipalities' case officers.

This report describes how selected municipalities in the Nordic region are working with artificial intelligence. It discusses how the adoption of the technology may affect trust in the Nordic region, both in terms of the population's trust in the public administration and social trust.

The report makes recommendations for how the municipalities in the Nordic region can work together on artificial intelligence.