

# Volume, benefits and factors that influence inter-municipal ICT cooperation in relation to ICT-related social services and healthcare services

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## Abstract

Information and communication technology (ICT) has become an integral part of the daily municipal administration, production and development of municipal services. Social services and health care account for  $\geq 50\%$  of municipal ICT expenditure. Municipalities operate and develop their ICT activities with limited ICT resources. This is an incentive for inter-municipal ICT cooperation. Four sets of secondary data are analysed in this article to evaluate how ICT cooperation is carried out in 20 Finnish municipal regions. Transaction cost economics (TCE), resource-based view (RBV), resource dependency theory (RDT) and the concepts of Granovetter's social network theory are reviewed. The data are used to describe the expected and perceived economic and social benefits of inter-municipal ICT cooperation, and to understand the social connections that influence the execution of inter-municipal ICT cooperation. The data analysis revealed distinctive differences in the amount and forms of ICT cooperation, and regarding its governance. The results suggest that public organisations were able to benefit substantially from well-organised ICT cooperation. The characteristics of social networks were also found to relate to variations in the degree to which ICT cooperation was performed.

**Keywords:** information systems, information management, communication, municipalities, social services, healthcare ICT

## Introduction

The deployment of information and communication technologies (ICT) has become an integral part of most municipal and public sector activities. Extensive digitalisation of municipal social services and healthcare services is progressing rapidly. The efficiency of ICT-enabled municipal social services and healthcare ser-

vices is important since they account for  $\geq 50\%$  of the municipal (and governmental) ICT expenditure [1].

The reform of the social services and healthcare system in Finland, effective from 2019, was an additional motivator for the current study. In the reform, the healthcare and social services (ICT) assets from over 300 municipalities will be transferred and consolidated into 18 provinces.

Municipalities develop and manage ICT assets with limited ICT resources, both in terms of finances and personnel [1]. A medium-sized municipality with 20 000 inhabitants usually employs 2-5 full-time ICT specialists while a small-sized municipality may not have any full-time ICT specialists. Regardless, part- or full-time municipal ICT professionals are responsible for the functioning of thousands of computers and other devices, and numerous information systems, applications and ICT services in their municipality [1-3]. It appears that municipalities have not recognised that their activities have become entirely dependent on ICT. The scarcity of ICT specialists may be influencing the implementation the previously referred social services and healthcare reform.

The objective of the current study is to describe how Finnish municipalities cooperate in ICT. To this end, the data of a countrywide research [1], covering ICT cooperation within 20 municipal regions with 144 municipalities cumulatively and funded by the Ministry of Finance, was analysed. The volume of ICT cooperation, perceived or expected ICT cooperation benefits, social communication characteristics that might support or impede ICT cooperation, and the use IT governance arrangements as a means of organising cooperation were evaluated. The findings discovered in the analysis of this data set [1] were combined with those obtained in three regional studies [2-4].

The number of inhabitants, the geographical, economic and industrial characteristics of municipalities, and the history of inter-municipal cooperation between municipalities in close proximity to one another differ. These variations, together with the Constitution-guaranteed legal independence of municipalities, affect inter-municipal ICT cooperation, which is voluntary, even after the social services and healthcare reform in Finland.

Against this background, we propose that the transaction cost economics (TCE) theory [5] and the resource-based view (RBV) of strategy [6] provide a solid theoretical basis to depict perceived or expected benefits arising from ICT cooperation (see also [2]). Similarly, we utilise the resource dependency theory (RDT) [7] and

Granovetter's social network theory [8,9,10,11] concepts as the descriptors of the resource and social network-related factors, which either promote or impede (ICT) cooperation once the existence of perceived or expected ICT cooperation benefits has been identified. Finally, we propose that research into IT governance practices [12,13] is useful in understanding how these practices influenced ICT cooperation and the achievement of ICT cooperation benefits.

### Research questions

In summary, the generic research question of the present study is: How do Finnish municipalities cooperate to achieve the benefits of ICT cooperation; and which resource, social mechanism and IT governance practice-related factors influence ICT cooperation and the ability to achieve ICT cooperation benefits? More specific research questions were formulated as the derivatives of the generic research question as follows:

1. How do Finnish municipalities cooperate in ICT and how is such cooperation organised and governed?
2. What benefits do Finnish municipalities expect to receive from ICT cooperation?
3. In what ways do resource dependencies, social network characteristics and IT governance arrangements relate to ICT cooperation between Finnish municipalities and to the achievement of expected ICT cooperation benefits?

The remainder of the article is organised as follows. In the next chapter, the theoretical background to the study is described. Thereafter, the research methods and data sets used in the data analysis are depicted. The results of the study are then reported, followed by a discussion and conclusion chapter.

### Theoretical background

The rationale of the transaction cost theory (TCE) is that, in executing its transactions, an organisation (mu-

nicipality) should rely on a form of governance that involves the least transaction costs [15]. There are three forms of governance:

- Hierarchical governance: The execution of transactions by using internal activities and resources.
- Market governance: The execution of transactions by purchasing activities and resources from markets.
- Relational or networked governance: The execution of transactions by pooling internal resources and activities within a network and/or by jointly purchasing resources and activities from markets.

According to TCE, the selection of optimal governance, such as municipal ICT cooperation and networked governance, depends on asset specificity, volume and uncertainty [5,15,16]. A simplistic interpretation is that municipalities should cooperate in relation to ICT assets with commonality to all of them to gain cost savings, when they are able to share scarce resources and obtain asset specificity related cost savings, and/or when they are able to reduce risks and obtain asset uncertainty related cost savings. ICT cooperation also requires that each participant achieves higher cost savings than what would be possible with other forms of governance. Numerous operational cost savings indicators have been identified in TCE research [16].

The resource based view (RBV) of strategy considers each organisation to be unique [6,17]. An organisation (municipality) is equivalent to a broad set of resources that it owns, at least half-permanently [18]. Overall, these resources – especially those that are imperfectly mobile, imitable and substitutable – define the value creation potential of the organisation. Thus, RBV focuses on how to add value, whereas TCE emphasises cost reductions. According to RBV, an organisation (municipality) should rely on inter-municipal ICT cooperation if that provides more value to cooperating participants through the pooling, aggregating, sharing and exchanging of their unique resources. For cooperation to occur,

it is also necessary that greater value cannot be accomplished by non-cooperating [19]. RBV research has cumulatively resulted in the identification of numerous operationalised value-adding indicators [6,18,19].

The RDT address interdependence between actors [7]. An actor (municipality) is dependent on other actors regarding its efforts to achieve a desired outcome in relation to an action, unless the actor has full control over it. According to RDT, most organisational outcomes are achieved through the joint action of interdependent agents, for example, by efficiently implementing ICT having purchased it from the same vendors. According to RDT, resource interdependence is characteristic of “open” societies (e.g., Finland) where organisations must cooperate to survive. The efficiency of a municipality determines how well it utilises its resources, including its ICT function. Efficiency is a performance indicator faced by ICT managers daily. Constraints on the actions of the ICT function (efficiency) result from the imbalance between limited internal resources and the pressure exerted by numerous external actors. These constraints limit the development and operation actions of municipal ICT functions. In other words, a myriad of external actors places pressure on a municipality ICT to acquire and implement new ICT services and applications, as well as invest in digitalisation. However, the municipality ICT will find it difficult to fulfil this owing to resource constraints. With inter-municipal ICT cooperation, ICT managers can extend their resources. Perceptions about inter-municipal resource dependencies are a strong incentive for cooperation.

The concepts behind Granovetter’s social network theory help to explain why inter-municipal ICT cooperation is either carried out or is not after the opportunities for beneficial cooperation have been identified. According to Granovetter, information and other resources flow through social networks and these flows build trust between the individuals within these networks [11]. Granovetter introduced the network density construct [11] to explain why it is easier to enforce norms into a dense network, rather than in a sparse one. For example, it is easier for nearby municipalities to execute inter-municipal ICT cooperation as opposed to those

who are on the other side of the country, owing to greater opportunities for frequent (dense) communication. The practical implication is that in terms of ICT cooperation, the most optimum results derive from the close, long-term, and focused cooperation and related social connections between ICT professionals in municipalities.

According to Granovetter, all organisations consist of several different social groups, to which individuals are connected via strong or weak ties. Strong ties are those within an individual's own social circle. They lead to shared values, norms, beliefs and behaviour. For example, the civil servants of a municipality develop strong ties through communicating regularly with one another. The more individuals interact with one another, the stronger their ties become. Deep ties may lead to a strong municipal identity. They may also result in a policy that ICT expenditure should be kept to a minimum produced by the prevailing deep ties (values and norms) of a municipality.

Weak ties between social groups provide access to information and resources beyond that available in one's own social circle, including new ideas and perspectives. According to Granovetter weak rather than strong ties determine the flow of ideas between social groups within a network [10,11]. The practical implication is that if time is not available to communicate with other social groups, such as ICT specialists in nearby municipalities, then the flow of information and other resources between these social groups is limited, i.e., ICT cooperation is weaker. Conversely, long-term and frequent communication between different social groups (via weak ties) results in considerably greater ICT cooperation and benefits.

The weak ties concept is augmented by the structural "hole" concept [11], according to which connections between different social groups within a network are even more significant than the nature of their ties. The suggestion is that total lack of connections between nearby municipal ICT experts will impede cooperation over ICT.

Granovetter introduced the social embeddedness [11] concept to describe the dualistic nature of social ties. The performance objectives of ICT cooperation and cooperation in general are typically expressed in economic terms. The ability to save ICT costs or effectively develop shared ICT services are examples of such objectives. On the other hand, social connections are largely non-economic [8,11]. Thus, the outcome of ICT cooperation between municipalities should not be based only on economic objectives and indicators, but should also include social indicators. For example, the development of ICT competencies in cooperation and/or knowledge sharing is more effective when the ICT specialists know and trust one another.

We conducted a literature search to identify related studies from Finland and other Nordic countries, without being strictly limited to ICT. As expected, municipal cooperation in Nordic countries and a comparison of the municipal activities between them was addressed in several studies. However, comparable studies, where the influence of resource dependencies or social networks on municipal cooperation had been investigated, or where the benefits of inter-municipal cooperation were linked to TCE and RBV theories, could not be found.

## Materials and methods

### *Data analysis*

A nationwide study and three regional ones (conducted in south-western and northern Finland) constituted the data of the current research.

### *The nationwide case*

The Republic Finland's Ministry of Finance funded the nationwide study [1] on 144 of the country's 317 municipalities, grouped in 20 regional areas. A report on the use of ICT was written about each regional area and included data on each municipality within the area. The number of municipalities per regional area varied between three and 17. To control data quality, the sizes of

the municipality population were verified by comparing the data of the reports with those of the Finnish Population Register Centre [20]. Major differences were not identified. Thus, the quality of the data was deemed to be satisfactory. However, three of 20 regional area reports were excluded from the data analysis since they only addressed selected specific issues or future scenarios, and thus differed significantly from the other reports. The remaining 17 reports were perused and their data were classified. We found out that the approach used and the contents of 17 reports were not fully compatible and comparable, thereby preventing the use of text analysis software. The source of the variation was explained by the fact that various consultants recruited by the ministry had written the reports. Two researchers read and analysed the data independently. Thereafter, the findings of the analysis were compared and consensus was obtained.

### ***South-western and northern Finland cases***

ICT cooperation among seven municipalities and one hospital district was investigated in the south-western Finland case study [4]. ICT cooperation had been performed for  $\geq 5$  years in this setting at the time of the study. Eight ICT leaders of the participating organisations were interviewed in personal face-to-face meetings, using an open-ended, semi-structured questionnaire. The interviewees were encouraged to provide comments and feedback on the issues being discussed. A list of the topics included in the interviews and discussions is provided in Table 1.

Municipal social services and healthcare ICT cooperation among 68 municipalities, 33 healthcare centres, nine hospitals, five healthcare districts and five social services centres [2]; and between nine municipalities and one joint municipal authority was assessed in two northern Finland case studies, respectively [3,21]. Since the quality of the data in these three case studies was previously evaluated in a peer-review process [2] and elsewhere [3,4,22], the data quality was deemed to be satisfactory.

**Table 1.** A list of the topics included in the interviews and discussions in the study conducted in south-western Finland.

Interview and discussion topics
Why do you cooperate with other municipalities in relation to ICT issues?
Which ICT issues does cooperation address in practice?
How is ICT-related cooperation organised?
How is ICT-related cooperation governed?
What are the costs of ICT-related cooperation (direct and indirect)?
What are the benefits and advantages of ICT-related cooperation?
How has ICT-related cooperation functioned to date? Please describe the actual consequences.
Have there been any challenges and disadvantages to ICT-related cooperation? (If “yes”, please describe how they have been managed).
What are future expectations (i.e., over 1-3 years and 4-5 years) regarding ICT-related cooperation?
How could ICT-related cooperation be improved?
How could the governance of ICT-related cooperation be improved?
Do you have any other comments?

## Results

### *Inter-municipal information and communication technologies related cooperation*

The size of the population ranged from 755 to 623732 inhabitants in the nationwide study. The number of ICT professionals varied from 0 to 483 in 139 of the 144 municipalities that provided these data. Statistics on the ICT professionals are provided in Table 2. The same data was not available in three case studies.

The majority of small municipalities did not employ any or very few ICT professionals. Twenty-seven municipalities (20% of 139) did not employ any ICT professionals (Table 2). The number of ICT personnel in 26 municipalities was  $\leq 1$  (other municipal civil servants carried out the ICT tasks in addition to their other duties). Inter-municipal ICT cooperation was most often conducted in relation to social services and healthcare ICT.

Data on the extent to which ICT cooperation was performed were compiled from 17 regional area reports and three case studies. The degree to which ICT cooperation was carried out was classified according to three categories; extensive and rather extensive, somewhat extensive and limited, rather limited and very limited. Extensive or rather extensive ICT cooperation was found to apply to seven of the 20 observations (areas), somewhat extensive or limited ICT cooperation to 12 of the 20 observations, and rather limited or very limited ICT cooperation to one of the 20 observations.

Extensive or fairly extensive ICT cooperation was interpreted to constitute formalised and regular (semi-official) ICT cooperation in the sourcing purchases from the same ICT vendors. Ad-hoc cooperation and irregular information sharing that was carried out from time to time, and involving shared ICT projects occasionally, was characteristic of somewhat extensive or limited ICT cooperation. Rather or very limited ICT cooperation translated to no ICT cooperation. The results indicated that ICT cooperation among nearby municipalities was typically modest (60%, 12 observations) and was classified in the somewhat extensive or limited ICT cooperation category. It was also noteworthy that even extensive or rather extensive ICT cooperation typically referred to joint purchases only, as opposed to the widespread development of ICT-enabled social, healthcare or other municipal services, or shared digitalisation.

Insufficiency of ICT resources, both financial and in terms of personnel, was the most cited reason for lack of ICT cooperation. The number of ICT personnel was so small that it was often necessary to allocate all the resources just to operate the most critical ICT services. The result was that inter-municipal ICT cooperation or the joint development of ICT services was not feasible. Efforts to cooperate were opposed with the claim that there were: “so many issues in our own organisation needing urgent attention that there was not enough time left over for cooperation” [2].

**Table 2.** The number of information and communication technologies related personnel in 139 municipalities.

Number of ICT personnel	Number of municipalities
0	27
$\leq 1$	26
1 to < 2	8
2-9	35
10-49	7
50-99	4
100+	3
No information/unknown	29/5

The RDT and Granovetter's social network theories assist with an understanding about these findings. Municipalities develop and produce similar ICT services and often use the same ICT vendors. These resource dependencies create an incentive for ICT cooperation. The entrenched belief (strong ties) in a municipality that ICT is a support function, which can be operated using low resources and without inter-municipal cooperation, has contributed to the insufficiency of ICT resources. This, and lack of weak ties, caused by the lack of available time for cooperation – and even structural holes – have created a situation with limited inter-municipal ICT cooperation.

Data analysis also demonstrated that typical ICT cooperation was an ad hoc exchange of experiences. For example, in the south-western Finland study, voluntary ICT cooperation took the form of informal and irregular meetings at which the current ICT activities of each municipality were discussed. The costs of cooperation were mainly attributed to the time spent by chief information officers in meetings. Only a few limited joint actions, e.g., a shared data centre project, were carried out over the five-year study period studied.

#### ***Perceived benefits of inter-municipal information and communication technology-related cooperation***

The northern Finland study [2] reported that inter-organisational IT governance arrangement was established in the Oulu University Hospital enactment area, consisting of a large number of social services and

healthcare organisations. The identification of 13 perceived ICT cooperation benefits (Table 3) was a mandatory prerequisite for the development of an IT governance arrangement in that area. Each of the 13 perceived benefits related to the TCE and/or resource RBV theories as shown in Table 3.

The benefits of inter-municipal ICT cooperation had to be analysed in a different way in the context of the other studies. The northern Finland study [3] did not address the benefits of ICT cooperation. According to the nationwide [1] and southern Finland studies [4], even extensive ICT cooperation was limited to joint purchases from the same ICT vendors. Therefore, it was not possible to accurately detect either the attained or perceived benefits of ICT cooperation since there was no deep cooperation, but only to identify what they could be potentially.

Sixteen of the 17 regional area reports in the nationwide study included ideas on how to better execute inter-municipal ICT cooperation. These were viewed in the current study as the potentially attainable benefits of inter-municipal ICT cooperation. The findings of the nationwide study were found to tentatively relate (in a generic way, as no realised benefits existed) to the TCE and/or RBV theories as shown in Table 4. Any association with the TCE theory meant that it was likely that the realisation of the idea would lead to cost savings, while any relation to the RBV theory signified that fulfilment of the idea would result in increased value, i.e., in a better service.

**Table 3.** Perceived benefits of inter-municipal information and communication technology-related cooperation in the northern Finland study.

Perceived benefit of inter-organizational ICT cooperation in municipal healthcare and social services ICT	Connection to the TCE and/or RBV theories
Avoid the development of overlapping and difficult to integrate IT services	RBV: Conserve resources TCE: Asset specificity
Increase the interoperability of patient/customer information systems and data storages	RBV: Obtain resources TCE: Asset specificity
Create enterprise architectures	RBV: Substitute resources TC: Reduce uncertainty
(Co-)source IT-services cost-efficiently and effectively	RBV: Create difficult to imitate resources TCE: Reduce the costs of non-specific assets
Implement national level healthcare and social services IT services efficiently and effectively	RBV: Access to resources that are difficult to imitate TCE: Acquire specific assets at a low cost
Ensure ability to participate to the national level development of healthcare and social services	RBV: Access to resources that are difficult to imitate TCE: Acquire assets that are specific at a low cost
Use IT resources and assets efficiently and effectively	RBV: These are the key concepts of RBV from the value creation perspective TCE: These are the key concepts of TCE from the cost reduction perspective
Ensure access to specialized capabilities and competencies everywhere in the area	RBV: Ensure access to rare resources TCE: Ensure availability of idiosyncratic assets
Ensure availability of equal healthcare and social services everywhere in the area	RBV: Ensure access to rare resources TCE: Ensure availability of idiosyncratic assets
Tighter cooperation on national level	RBV: Substitute resources TCE: Reduce uncertainty
Tighter cooperation on regional level	RBV: Share unique resources TCE: Reduce the impact of idiosyncratic assets
The creation of jointly agreed data models and sticking to them	RBV: Value through pooling TCE: Reduce uncertainty
Tighter cooperation between healthcare and social services	RBV: Create substitute value TCE: Reduce behavioural uncertainty



**Table 4.** Suggested ways in which to better develop and improve inter-municipal information and communication technology-related cooperation, identified in the nationwide study.

Suggested ways to improve inter-municipal ICT cooperation	No. of responses ( <i>n</i> = 16)	Connection to the TCE and/or to RBV theories
Data centre or server cooperation	9	TCE
Joint procurement	7	TCE
Shared development and national cooperation	6	TCE, RBV
Development-related cooperation within a group of municipalities	4	TCE, RBV
The purchase of shares in an existing company or organisation	3	RBV
The establishment of a new shared ICT service company	2	TCE, RBV
Discussion forums	2	RBV
Mergers between municipalities	1	TCE, RBV

The focus of improving ICT cooperation was primary on the economic benefits to be gained, i.e., cost savings. If a data centre and server costs were combined, in conjunction with more effective shared procurement, it is likely that cost savings would result as TCE suggest. It is probable that the realisation of other ideas, such as the establishment of discussion forums and effecting extensions to the ownership of service companies, would lead to the attainment of increased value as RBV suggest. Fulfilment of most of the proposals on how to increase ICT cooperation, e.g., shared development, would lead to cost savings and increased value type benefits (TCE and RBV). The voluntary nature of inter-municipal ICT cooperation, governed by limited political guidance, was regarded to be invaluable in most reports derived from the study that was conducted nationally. The current vastly informal ICT governance models were also perceived to function well in general. However, it was also stated in most reports that en-

hancement of the official status and the prioritisation of inter-municipal ICT cooperation, as well as improved national and municipal guidance from senior management, would expedite cooperation on larger ICT projects.

The perceived benefits of inter-municipal ICT cooperation were also determined in relation to the findings of the southern Finland study [4]. In general, the suggested ways in which to develop and improve inter-municipal ICT cooperation were more specific and concrete in the southern Finland study than those in the nationwide study as Table 5 shows. RBV-related value enhancing ideas, such as improved structure and governance in relation to meetings, and greater cooperation with universities, were prioritised. Even though the current unofficial and ad hoc mode of cooperation was preferred, better structured and more formally governed ICT cooperation was seen to be more effective.

**Table 5.** Suggested ways in which to develop and improve inter-municipal information and communication technology-related cooperation, identified in the southern Finland study.

Suggested ways to improve inter-municipal ICT cooperation	No. of responses (n = 8)	Connection to the TCE and/or to RBV theories
Improved structure and governance in relation to meetings	4	RBV
A greater number of valid projects with increased efficiency	3	TCE and RBV
Shared IT resources	2	TCE and RBV
A larger role in terms of cooperation with universities	2	RBV
Joint IT roadmap	1	TCE and RBV
Joint identification management (IDM)	1	TCE
Joint active directory (AD)	1	TCE
Joint enterprise architecture (EA)	1	TCE and RBV
Shared IT resources and equipment	1	TCE and RBV
Increased guidance from top management	1	RBV
Improved communication and information sharing	1	RBV
Greater guidance at national level	1	RBV
The amalgamation of external ideas	1	RBV
A discussion forum for IT personnel	1	RBV

***The impact of inter-municipal information and communication technologies -related governance on municipal efficacy***

Inter-municipal ICT cooperation was well organised and governed in only three regional areas. Data analysis demonstrated that effectively executed inter-municipal ICT cooperation was associated with numerous benefits. In the event of ICT cooperation, activities would take place guided by clearer objectives, leading to concrete and expected benefits, while ICT resources and challenges would be shared among nearby municipalities. Well managed ICT cooperation would also reduce the challenge of municipalities having access to limited ICT resources, would assist them in establishing shared ICT and digitalisation, and in promoting issues of significance to ICT.

If the benefits of effectively governed inter-municipal ICT cooperation have been identified as significant, why

do municipal ICT professionals not exploit such opportunities more often? The lack of time available to ICT professionals to conduct cooperation is the main reason given to this in the data. This issue has already been briefly touched in this article. Lack of time is reflective of the influence of dense inter-municipal social ties [11], as well as the lack of weak inter-municipal social ties within the social networks in most municipal areas. Structural “holes” have also been identified in the social networks. Inter-municipal social ties are needed to build trust, and to share information and new ideas among municipalities.

In both the studies conducted in northern Finland [2,3], the establishment of ICT governance was an explicitly stated objective. According to Hyvönen [3], “the purpose of the agreement and designed inter-municipal ICT cooperation was to sharpen and clarify ICT governance, and by so doing, enhance service capability and

ICT productivity". Participating municipalities agreed on shared objectives and targeted areas for development in relation to inter-organisational ICT cooperation among municipalities. The latter also signed cooperation and project agreements and commenced the implementation of shared projects. The stated objective of the other northern Finland study was similar [2]. According to the available data, ICT cooperation had progressed well in terms of inter-organisational ICT governance.

In the south-western Finland study, inter-municipal ICT cooperation was less well organised but efficient cooperation was nevertheless perceived to be a desirable goal. ICT cooperation occurred during ad hoc bi-monthly meetings chaired by the ICT director of the largest municipality. The meetings were not formally structured; sometimes lacking an agenda and/or the minutes were not taken. Each ICT leader briefly presented the most recent ICT activities and plans for the near future for his or her organisation. Challenges and common interests were discussed. These discussions resulted in a few shared projects that were executed as separate project teams. The number of shared projects was also small. The participation of each municipality to a project was voluntary, as opposed to an attempt to persuade all cooperating municipalities to participate in a given project. Shared projects were of great significance to the participating municipalities. Satisfaction with the project results was indicated in interviews.

According to the 17 regional area reports of the nationwide study, inter-organisational ICT cooperation was well executed in only one regional area, consisting of a city and eight smaller municipalities that surround it. Eight municipalities had established an alliance (an IT governance model), according to which ICT services for eight municipalities were coordinated and developed. The municipalities recruited a shared ICT director. The alignment of the ICT managerial activities between eight municipalities and the city was also established. In addition to inter-municipal ICT cooperation, the city and eight municipalities also managed their own projects, and held working groups and meetings on issues, which were local. Both the city and surrounding municipalities expressed satisfaction with the ICT governance ar-

range and with what had been achieved through inter-municipal ICT cooperation.

## Discussion

The primary study objective was to investigate how Finnish municipalities cooperate in ICT. This was achieved by analysing the secondary data, and by identifying associations between the findings of the data analysis and theoretical background concepts.

Finnish municipalities were largely observed to manage ICT-related activities and resources in isolation without well-coordinated inter-municipal ICT cooperation. According to the Constitution of Finland [14], municipalities are independent self-governed entities. However, those who are in close geographical proximity to one another sometimes consider ICT cooperation for several reasons, including the perceived incentives of significant cost savings and the need for service quality improvement.

Municipality size is usually small in relation to the need for ICT investment and development. The availability of resources to municipalities is usually limited and the ability to develop municipal services depends increasingly on the deployment of ICT. Furthermore, the guidelines that govern municipal and public service reform, e.g., of the social services and the healthcare system in Finland, explicitly state that ICT and service digitalisation are important to the implementation of reforms. Pressures such as these and resource dependencies are strong drivers of inter-municipal ICT cooperation.

We discovered that ICT cooperation was usually somewhat extensive or limited although the attitude of most municipalities to inter-municipal ICT cooperation was favourable. We also discovered that extensive or rather extensive inter-municipal ICT cooperation was restricted only to joint purchases from the same ICT vendors. Well executed inter-municipal ICT cooperation was only identified in three regional areas of the 20 potential areas analysed. This answers the first research question of the study.

Since inter-municipal cooperation was limited, the perceived benefits of inter-municipal ICT cooperation were determined, based on ideas about possible ways to facilitate ICT-related cooperation and the related potential consequences. There was one exception [2] whereby the perceived benefits of inter-municipal ICT cooperation were explicitly specified. Both expected and perceived benefits included economic and non-economic benefits. The TCE theory (cost savings) and the RBV of strategy (value added) were used to describe the expected and perceived benefits against these theoretical concepts. This constitutes the answer to the second research question.

Extensive inter-municipal ICT cooperation was relatively rare, despite the existence of resource dependency and benefit achievement incentives. ICT professionals struggled with limited ICT resources and their time was tied to operating key ICT services, leaving no time to develop inter-municipal ICT cooperation. Three regional areas were identified where ICT cooperation was considerably well organised. One region shared the ICT managerial function, another utilised a jointly owned ICT service company and a third had an inter-organizational ICT governance arrangement, according to which the ICT services were divided into national, regional and municipal categories. ICT cooperation was perceived to have resulted in immeasurable benefits. The contrast between these regions and those with limited inter-municipal ICT cooperation was clear. ICT professionals in other regional areas were dissatisfied with the lack of inter-municipal ICT cooperation. The concepts of the RDT and Granovetter's social network theory, especially density, strong ties, weak ties and structural "holes" assisted with an understanding why most ICT professionals did not have time to develop inter-municipal ICT cooperation. These concepts helped with an appreciation of differences in the attitudes of those who actively cooperated and those who do not. This is the response to the third research question.

Data analysis and available statistics [1] regarding inter-municipal cooperation in other municipal activities revealed that inter-municipal ICT cooperation was more limited in ICT in Finland than in other municipal activities, and this can possibly be attributed to time limita-

tions, as explained. However, it is most likely to pertain to social connections within and between municipalities, and the beliefs reflected by these associations.

Municipal dependence on ICT-enabled activities and services has increased rapidly over the last 10 years, during which time Finnish municipalities have operated within a climate of diminished economic growth, demographic change and rapid increases in social services and healthcare expenditure. These developments, together with beliefs (advocated through strong social ties) that ICT remains a support function to municipal activities and services, have contributed to perceptions of under-resourcing and time constraints, which are strongly present in the analysed data. Further research is warranted needed to support these conclusions.

There are some study limitations. The study was conducted in one country and cumulatively involved half of its municipalities. Thus, the results should be interpreted cautiously. Well governed inter-municipal ICT cooperation was only identified in a few regional areas. The ability to effectively compare well organised and disorganised ICT cooperation was therefore limited by the scarcity of available data. Thus, similar studies should be conducted in other countries, data collection should be extended to other regional areas in Finland and additional case studies should be carried out to address these limitations.

## Conclusion

In addition to its academic contribution, the current research has practical value. Inter-organisational ICT cooperation between municipalities often starts gradually. ICT professionals like to discuss professional matters with their colleagues and share experiences. Social embeddedness in a social network [11] then leads to better organised (ICT) cooperation and, as our study shows, to more benefits when (ICT) cooperation is well governed.

The importance of social connections is emphasised. Researchers are advised to investigate the social mechanism of inter-organisational ICT governance as an

antecedent to successful inter-organisational ICT governance. This will help them to better understand the significance of social ties in digitalisation. Practitioners are encouraged to invest time and effort into the establishment of well organised and governed measures to expedite ICT cooperation. This will result in considerable benefits from the utilisation of ICT in relation to issues that are amenable to inter-municipal ICT cooperation. Addressing these issues could even contribute to the social services and healthcare reform in Finland.

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