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The long road to data-driven decision-making

How do casework registrations become management information?

Matilde Høybye-Mortensen & Peter Ejbye-Ernst

DASTS er en faglig forening for STS i Danmark med det formål at stimulere kvaliteten, bredden og samarbejdet inden for dansk STS-forskning samt at markere dansk STS tydeligere i nationale og internationale sammenhænge.

The long road to data-driven decision-making

How do casework registrations become management information?

Matilde Høybye-Mortensen & Peter Ejbye-Ernst

The implementation of digital technologies in organisations is often seen as a means by which to ease the administrative burden, create transparency, and to provide for better management information. Based on in-depth interviews with social workers, admin staff, and managers from eleven Danish municipal disability offices, this paper shows the nuances of the perceptions and ambitions to make management and welfare organisations data-driven. The article maps the infrastructures making management information possible. When social workers insert data in digital case management systems (CMS) on clients, services, and service costs, it becomes possible to extract this data and use it as management information. However, achieving this requires much more than a few clicks of a mouse. In fact, there is quite a lot of invisible work performed by the admin staff. The paper demonstrates how information on cost data and case overview travels and transforms within an organisational hierarchy. The analysis shows that the human impact is not out of the equation, even though some performance information is automatically aggregated. Performance information is indeed a result of cooperation between man and machine. Seeing as information is not a neutral raw material to be easily transported challenges the belief in data-driven organisations as a pure technical matter.

Introduction

In countries with a large public sector, you can get help with anything from opening letters to personal hygiene. But how do municipalities manage all of this welfare? How do they ensure that they stay within budget and achieve their goals? When considering contemporary public welfare services, there would appear to be a deadlock between, on one side, the quest for more accountability resulting in an increasing number of registration requirements (which Power refers to as *the audit society* (1999)), and on the other side an ongoing struggle against red tape and superfluous administration taking time away from the citizens.

In welfare services around the world, high hopes are linked to Information and Communication Technology (ICT) as a way to enhance public administration efficiency by easing administrative tasks, facilitating coordination, and producing management information (Høybye-Mortensen, 2016). One of the commonly used ICTs to help manage welfare services is digital 'case management systems' (CMS). The use of this technology means that in addition to their services to clients, caseworkers are also expected to deliver information for use by managers to measure performance (De Witte, Declercq, and Hermans, 2016).

The majority of performance information is based on aggregations of individual caseworker recordings carried out in digital CMS or electronic client records. One might therefore argue that one of the purposes of CMS is to overcome the information asymmetry between the street-level and managerial level by disseminating information on specific cases or variables upwards in the organisational hierarchy. The Danish Ministry of Social and Domestic Affairs has declared their expectations to ICT generated performance information as follows:

> "A proficient amount of data will support better social services by facilitating identification of the types of services, which make the best results and are most cost effective [own translation]" (2016: 241).

What is not outlined, however, are the many steps between introducing a CMS and data supported social services. By focusing on the processes through which social workers' registrations are transformed to management information by the intervention of administrative staff (admin staff), this article addresses some of these intermediate steps. We apply an understanding of technology taken from the Science Technology Studies (STS) tradition, where technology is considered a relational phenomenon. Data consist of qualitative interviews with employees in 11 Danish municipal disability services.

ICT in social work

The introduction of CMS in welfare services is hardly a uniquely Danish phenomenon, as they have spread globally, from Australia to Norway and from the UK to Taiwan. Extensive studies have investigated ICT use in child welfare, particularly in the UK and Australia (Broadhurst et al., 2010a; Broadhurst et al., 2010b; Gillingham, 2009; Gillingham and Humphreys, 2010; White et al., 2010; White, Hall, and Peckover, 2009), and ICT use in adult services has also been studied (Brown and Calnan, 2011; Caswell, Marston, and Larsen, 2010; Dearman, 2005; Marston, 2006). Following this, there is a growing research interest in how practitioners use and interact with ICT (Gillingham 2017).

Many of the studies of CMS and recordings in the social work literature have been sceptical, often finding the recordings in CMS as being in opposition to the core tasks of the social workers and imposing a different, more managerial logic on the social work. One line of argument is focusing on how the use of CMS makes the form of knowledge in social work shift from a narrative to a database way of thinking (Parton 2008). Other studies on the integration of CMS in social work practice have focused on the time-consuming aspects brought about by the registration burden and how these are reducing the time available for engaging users:

> "some of the major problems that have been identified with current forms of IS [Information Systems, ed.] are closely related to the information that they are designed to capture about service users and service activity. The amounts of data that are required to be entered into IS have, in most instances, reduced the amount of time spent by social workers with service users" (Gillingham, 2013: 4).

Others have pointed out the changes in accountability due to new CMS and more recordings, as recording is equated to quality and accountability. The new technologies are said to favour organisational and bureaucratic accountabilities over professional values (Burton and Van den Broek, 2009).

An oft-debated theme in street-level research regarding the impact of digital technologies is the room left for discretion. Street-level bureaucrats, such as social workers, are expected to exercise discretionary judgement when doing their work, for instance when deciding which rules applies in a particular situation or what level of need a citizen have (Lipsky 1980). The negative impact of ICTs seems to have received more attention than the possible positive ones (Buffat 2015). Basically, researchers see the technology as taking over street-level work either directly as decision-making systems (Bovens and Zouridis, 2002) or indirectly as time-consuming monsters. Chandler, Berg, Ellison, and Barry provide an example of the latter:

> "computer-based systems were not a neutral tool but part of the means by which change was brought about. Increasingly the frontline social worker's practice was driven by the demands of the system so that, according to a study by White (2009), 60-80% of social workers' time was taken up with report writing rather than talking to clients or colleagues" (2017: 71).

While a few studies thus have started investigating the way the introduction of ICTs influence the practices of case workers, there is still a lack of theoretical understanding of ICT use in social work – and therefore a need for more knowledge about ICT use and usefulness in social services (De Witte, Declercq, and Hermans 2016).

In the social work literature, ICTs are often understood and studied as management tools. This means that the technologies are approached as *instruments* that impact social work from an outside position. This article argues for a different approach to technology. Instead of a priori considering the technology to be part of a rational process wherein management is introducing technology to achieve a specific goal, we apply an understanding of technology taken from the Science Technology Studies (STS) tradition, where technology is considered a relational phenomenon. We conceptualise the organisational production process of performance information as infrastructure and therefore consider the various computer systems as part of the infrastructure for the management information.

> "Information infrastructure refers loosely to digital facilities and services usually associated with the internet: computational services, help desks, and data repositories" (Bowker et al., 2010: 98).

As Bowker et al. also state, infrastructure is often invisible and its consequences difficult to trace.

> "Infrastructure typically exists in the background, it is invisible, and it is frequently taken for granted [...] in such a marginalized state its consequences become difficult to trace and politics are easily buried in technical encodings" (Bowker et al., 2010: 98).

Inspired by Susan Star (1990) our approach is therefore not a study of the impact of a particular technology on social work but rather a study of the processes through which management information is produced through interaction between human actors and technology. We focus on this interaction because the core assumption of how management decisions will benefit from the introduction of CMS in social work organisations is exactly that information on all individual cases can travel freely within the organisation and be aggregated into meaningful, reliable information. By focusing on the processes through which social workers' registrations are transformed to management information by the intervention of admin staff, this article brings together the literature on ICTs in social work and the STS tradition. By combining these two perspectives, the ambition is to provide new insight into how management information is produced in social work organisations by avoiding the a priori understanding of ICT as a management tool detrimental to professionalism.

We therefore believe it to be of interest to social workers and management alike to obtain insight into what actually happens with the data they produce in the systems (social workers) and the process and translations prior to management delivery (managers). Seen from a caseworker perspective, the aim of the article is, thus, to foreground that which is usually a backstage phenomenon in the production of management information.

The research questions addressed in this paper are: *What does the infrastructure enabling the production of management information look like? And what are the consequences of the infrastructure?*

Methodology

Inspired by Star (1990, 1999) we want to take the artefacts serious, therefore we apply an exploratory approach whereby you do not define the particularly technology of interest but rather focus on the networks of technologies and actors. We wish to follow this path and focus on the networks creating management information in the disability offices. Our case is constituted by various computer systems such as the CMS called DHUV, excel and electronic cost- and wage-systems,

the staff involved in case processing and the administration of disability services in 11 Danish municipalities. We want to conceptualise this production network not as separate entities but rather as an organisational infrastructure. We thus follow Bowker et al. (2010) and aim to do a bit of 'infrastructural inversion', our focus being on changes in *infrastructural relations* rather than *infrastructural components* (Bowker et al., 2010: 99). By doing 'infrastructural inversion' we aim to foreground the truly backstage elements of work practice (Bowker 1994). We have done so through interviewing about all the seemingly technical and nitty-gritty details of the interviewees' work; the various computer systems, interpretations of categories and fields in the system, how the different systems are used and what kind of performance information they are involved in producing. By interviewing actors involved in different parts of the production process, we gained insight into the full infrastructure enabling performance information in the disability offices.

The epistemological point of departure is that the involved actors are making meaning based on their circumstances, '*and that these meanings would be inscribed into their judgments about the built information environment*' (Star 1999: 383). Infrastructure resists and fights back if it is not embedded or transparent to use (Star 1999). We conducted interviews prior to and after (or *during* as it turned out in some municipalities) introducing a new system to the organisation (the new CMS supporting the Adult Assessment Scheme), because we believe the infrastructure to be most visible to the actors at the time of introducing a new system that is inevitably malfunctioning in the beginning.

[1] The assessment method is called the Adult Assessment Scheme (AAS). In Danish, *Voksenudredningsmetoden* (VUM).

Overall outline of the study

The study was designed as a longitudinal study in the disability offices of 11 Danish municipalities. Interviews were conducted with social workers, admin staff and managers in each municipality before and after the introduction of a new CMS, intended to support a new nationally developed assessment method (AAS).[1] This approach was utilised based on the assumption that the implementation of a new CMS would render the usually latent infrastructures of information visible. The first phase included all 11 municipalities while the second phase included nine of the original 11 (in total 67 interviews). Two municipalities were unwilling to participate in the second round of interviews because the CMS had not (yet) been implemented. This paper mainly reports on the analysis of interviews with managers and admin staff from the nine municipalities who participated in the second round, but the complete empirical materials functions as background knowledge. The process of analysis is described in the section 'Empirical data'.

Case presentation: municipal disability offices

In 2007 local government reform reduced the number of municipalities in Denmark from 275 to 98. This reform also made the municipalities responsible for a number of areas that had previously been handled on a regional level. This included responsibility for many of the residence homes and institutions specialised in taking care of various physical and mental disabilities. These additional areas posed a challenge to the municipalities, particularly for those that were simultaneously undergoing merger. In the first round of interviews (2012), there were many references to the difficulty in obtaining a total overview of the area after the reform, even though the reform dates back 5 years at the time of the interview. Several of the municipalities also had histories of layoffs of managers after severe budget

deficits. As such, the disability offices represent an area with a history of poor management information.

The primary task of the municipal disability offices is to implement national law and grant services to adults with mental and/or physical disabilities. The services range from house calls twice a week to help with tasks such as sorting mail and paying the bills to comprehensive 24/7 care provided either in a private home or a residence facility.[2] The temporary and permanent residence facilities (sections 107 and 108 in The Social Service Act) are the most costly, and the intake of just one or two additional clients can have a major impact on the limited budget of a small municipality. This means that municipalities must sometimes choose between exceeding their budget or providing suboptimal care for citizens. To borrow from Hasenfeld (1983), the disability offices are thus 'human processing' organisations dealing with *wicked problems*; that is, problems that do not have an objectively (best) solution.

The disability offices are organised around a purchaser–provider split. Social workers assess the needs of the client in question, this assessment is recorded digitally in one system or another and thus feeds in to the performance information. When deemed eligible, a provider (public or private) is asked to deliver a specified service to the client. These services might have different costs. The social workers decision-making on eligibility and choice of service is obviously of key interest to managers, as the social workers function as gatekeepers with discretionary powers and make some potentially very expensive decisions. One of the main concerns voiced by managers is not surprisingly how to get an overview of the collective amount of clients deemed eligible, the service they are granted and the cost hereof.

[2] The services are provided according to the Consolidation act on Social Services, particularly the sections 85, 107 and 108. In Danish, *Serviceloven*.

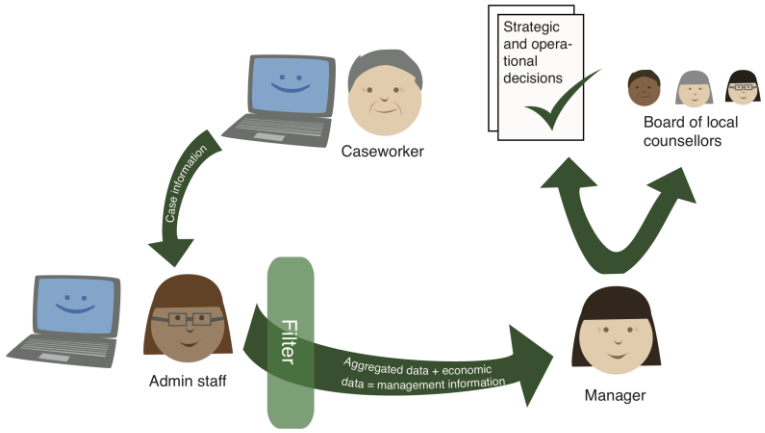

Figure 1. Actors in the municipal disability offices

Managers are responsible for the purchaser side and are, as such, the head of the social workers. Each disability office also has one or more administrative staff responsible for paying bills, preparing budgets and creating management information to the manager. Generally speaking, only the social workers have direct contact with the clients and enter case information in the CMSs. The social workers and admin staff might have frequent and direct communication; for instance, the caseworkers might have to send an email with the price agreed on with the provider or there might be a minimum of direct communication if the admin staff draws the relevant information from the CMS.

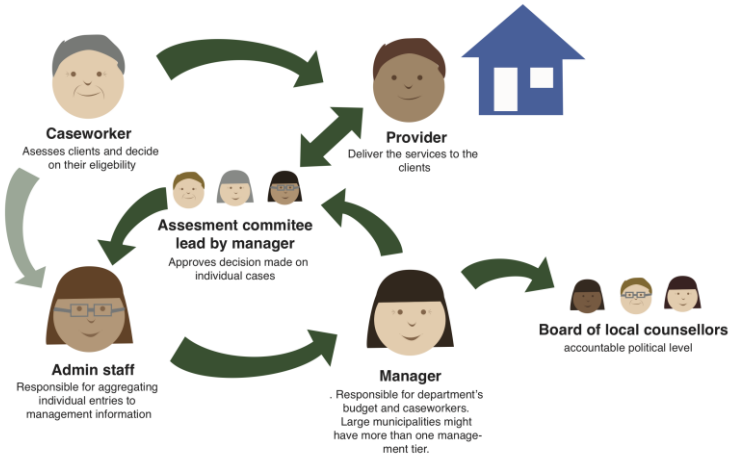

Figure 2. The production cycle of management information

The participating municipalities

The 11 participating municipalities were chosen because they were about to implement a CMS supporting the AAS assessment method in 2012. At that point they already had or were about to sign a contract with a CMS provider and estimated an implementation period of 1–1½ years. The set up made it possible (in theory) to study how the implementation of a new CMS influences the production of management information. Unsurprisingly, all 11 municipalities encountered implementation problems, and only five of them had more or less completely implemented the CMS 2 years later. The municipalities were free to choose whom to provide the ICT.

Empirical data

The empirical data consists primarily of interviews with social workers, admin staff, and managers. The empirical basis of the study is, thus, not the actual practice in the organisation but rather the reflections about practices presented by the employees in the interviews. Interviews were conducted at two different points in time. If possible, the same persons were interviewed twice, but this was not possible in all municipalities due to changes in positions or organisation. In such cases, the person presently taking care of this area was interviewed instead.

	Round 1 (2012)	**Round 2 (2013-2014)**
Interview	37 interviews (in 11 municipalities).	30 interviews (in 9 municipalities).
Descriptions of organisational characteristics	11 in total. One for each municipal. The municipalities were given opportunity to verify the descriptions and object to incorrect information.	
Mini survey	After the first interview round we worked out 9 different elements of management information and as a baseline scored the 11 municipalities accordingly. The survey in round two builds on these 9 elements.	13 replies in total. One for each of the 11 municipalities, and three in the largest municipality (the admin staff had specialised task).

Figure 3. List of total empirical data.

First, the interviews with managers and admin staff were analysed using the software program Nvivo. We categorised the transcribed interview with two separate codes. 1) Production of management information, including interview passages where the interview person is

describing various elements of the production, ranging from the insertion of data, use of CMS, extracting data and so forth. 2) The perception of management information, including interview passages where the informant directly or indirectly expresses how they see the management information. After this first sorting, the contents of the two codes were analysed more bottom-up in the search for common themes across several interviews. The themes were included in the analysis if they occurred in more than four municipalities.

Analytical framework

To answer our research questions (*What does the infrastructure enabling the production of management information look like? And what are the consequences of the infrastructure?*), we first address the 'how' of the production of management information. We do this, not by meticulously describing how reports and tables are made in the 11 different municipalities but rather by describing where the sore thumbs are in producing the management information. This approach was chosen since, as argued above, infrastructure becomes most visible when it is not working. This approach has resulted in the first part of the analysis, where two issues are addressed (inserting cost data and how to create the most valid overview of clients, prices, and activities). By focusing on the nitty-gritty details about how data is inserted, extracted, and juggled with, we are foregrounding the truly backstage elements of work practice, as suggested by Bowker (1994).

Second, we focus on what the infrastructure looks like to different actors and therefore ask how managers and admin staff perceive the management information. We do so in line with Star (1999) by analysing whether they perceive it as a material artefact, a trace or record of activities, or a veridical representation of the world.

A tablespoon of cinnamon: How management information is produced

In this section we show how management information is produced and how this requires a hand on approach – and thus is far from an automatized process. Just as the chef from South Park has his recipe for salty chocolate balls (starting with a tablespoon of cinnamon), so has each admin staff their individual recipe for making management information.

As described earlier, infrastructure resists and fights back if it is not embedded or transparent to use. In our understanding, this means that the issues voiced as problems or challenges in the interviews exemplify parts of the infrastructure that are neither embedded nor transparent to use, and which are therefore visible to actors. One such issue is *overview*. Overview is understood in the municipalities as a valid and up-to-date overview of clients, costs, and activities. It could for instance contain the following information:

Type of services	Number of citizens	Cost per day (Danish kroner)
Temporary residency § 107	21	182.700
Permanent residency §108	10	85.505
Home care § 85	34	68.000

Figure 4. Example of cost overview.

In the following paragraphs we will address two such challenges that were presented by the informants. The first challenge is the reflections over which tools is better the CMS or spreadsheets. The second voiced issue is whether admin staff or social worker should insert the cost data into the digital systems.

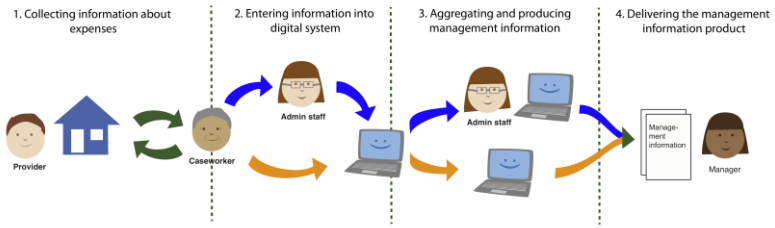

Figure 5. The phases of working up the management information (cost data).

CMS or spreadsheets?

Despite the expectation that the CMS would reduce the administrative burden and thus make the spreadsheets redundant, the spreadsheets oddly, persist as a living dinosaur in a modern zoo. All of the municipalities in the sample are using multiple digital systems to administer the disability services (one for paying bills, one to archive letters and documents, one to document client assessments, and sometimes two or three additional systems). Nevertheless, there seems to be an extreme fondness of the manually updated Excel spreadsheet (Municipalities A, B, D, and E). Why so? What makes spreadsheets so appealing? The admin staff in Municipality E elaborates on her affection for the spreadsheet:

> "On January 1st last year we got a new economy system [...] I was told that my spreadsheets were now redundant, because this new system was more stable. It turned out it wasn't. So I'm very pleased that I kept updating my spreadsheets. I get the economy reports from them every month. It's the spreadsheet that tells how our economy is. It's a really advanced spreadsheet – it's our lifeblood." (Admin staff, Municipality E)

So why even bother to replace it? Well, since it is manually updated and the reports are manually produced, the system is fragile and very person-dependent. In this particular municipality, only three employees can access and use the spreadsheet. Asked the question: "*when you win 10 million in the lottery and don't want to work anymore, who is then going to maintain the spreadsheet?*" the admin staff replies:

> "Nobody. There's no one else who can do it. Well, there is one who helps me update it and another one can also access it. But she sometimes messes it up a bit. She destroys the formulas. Well, it makes it too vulnerable." (Admin staff, Municipality E)

Numerous managers and admin staff expressed concerns about trust when implementing a new system. They feared that the CMS-generated performance information might not be valid and that they would therefore risk making decisions on the faulty premises (Municipalities A, C, E, F, and G). These concerns result in the continuation of the old, familiar systems, such as manually updated spreadsheets (Municipalities A, C, E, and G). The automated translations of the new CMS's are thus supplemented with the well know paths of the manual calculations. This preference seems to be based mainly on the reduced transparency that comes with the unfamiliar automation. When using the spreadsheets, the user is both system builder and user, whereas when using the CMS the algorithms are hidden for the users making it impossible for the users to see the premises for the calculations.

In the municipalities (B, C, and G) that chose a CMS from the provider INCORP (the system producing the fewest implementation difficulties), the experience is that the new CMS provides them with new opportunities, such as an overview of the status of cases and workload on each individual caseworker. This means that the managers do not have to inconvenience social workers by asking them to go through their caseload every time they require information (e.g., how many clients do we have over 60 years? How many clients live at this particular residence?). The new CMS, however, can only aggregate the

information that is fed into them. While the possibilities might be endless in theory, the managers talk about finding the point of equivalence – the more management information you want to extract from the CMS, the heavier a registration burden you impose on the social workers. This increases the risk of less focused registration and, hence, less reliable management information. The manager from Municipality B explains:

> "There are many new options [in the new CMS], we can draw charts and things like that. [In order to do this] it requires that everyone agrees 100% on how deep we go into the system; the more I want to know, the deeper they [social workers] have to work the system and tick off boxes. So this is what we're working on right now. It's important that everyone is committed and feels part of it [if the management information is going to be reliable]." (Manager, Municipality B)

The main difference caused by introducing a CMS or new economic system is therefore not more information on costs and spending but rather a difference in the hours spent generating the information and in familiarity with the system. In terms of the reliability of the information, many managers and admin staff expressed concerns about whether the CMSs would be just as good as their current or previous spreadsheets.

Furthermore, admin staff speaks of the necessity to perform quality checks from time to time. Quality is not merely a matter of how good the services delivered to citizens are. A more basic level of ensuring quality is to have a reliable system that gives the disability offices certainty about checking up on all citizens and ensuring that funds are budgeted to last the entire year. As such, the information infrastructure is the backbone in the quality checks carried out by the disability offices. This might explain the reluctance to abandon the Excel spreadsheets even after introducing the new CMS as well as explaining the general mistrust to the CMS. But once they stop updating the spreadsheets, these will no longer be of use as triangulation for the CMS-generated management information.

Cost data: caseworker or admin staff?

The municipalities have different takes on who should insert the cost data. In favour of having the caseworker doing it are managers emphasizing how it would be good if the caseworkers got more concerned with the cost of the services they grant to citizens – and this would also simplify the administrative processes. In favour of having admin staff doing it is the belief, that they will be more meticulous when inserting the cost data (thus ensuring more correct data) as they are more interested in the monetary side of business, whereas caseworkers are more interested in the clients.

The cost data has top priority across all 11 municipalities and is consistently considered to be of fundamental importance to service management. In all of the municipalities, the managers state that they (at last!) have a fairly good grasp of the data on cost and spending and that they are staying within the budget (or are able to explain why not) based on the management information. Since the correct and updated data on prices and contracts with providers are pivotal for following the budget, the registration of this particular data is subject to scrutiny in all of the disability offices. One issue of concern is who should insert the cost data: the social workers or the admin staff (see phase 2 in Figure 3). This debate illustrates the fracture between social casework and administrative tasks. In the literature social workers are generally not considered to be very concerned with cost and prices on services (see for instance Schrøder 2014). The admin staff is, on the other hand, considered to only concentrate on the economy: paying the bills and staying within the budget. This understanding of how the tasks are distributed is more or less shared by social workers, admin staff, and managers. The fracture between economy tasks and social work tasks proves to be a challenge to the infrastructure. Since

the social workers are assessing the clients, they also make the arrangements with the providers (e.g., on price, duration). However, since the admin staff is responsible for following and updating the budget, they must pay the bills and keep tabs on spending. How can they build an information infrastructure sufficiently strong and agile to overcome this division of labour? Here, we see a beginning change in the infrastructure relations.

In Municipality B, even though they have implemented the new CMS, there is no interface between the CMS (Incorp) and their economy system (OPUS), which pays their bills. The manager from Municipality B explains the division of labour in her office:

> "The social workers are in charge of the case and how it proceeds. So obviously they also need to know the cost. Anyhow, the admin staff is still participating in the board meetings [where management sanctions decisions in individual cases, for instance on granting a place in a residency] and get the information directly when a decision has been made and then insert the numbers immediately in the economy system'. The manager is very particular about the importance of correctly inserting the prices, something she does not trust the social workers to do: 'a system is only worth something if it's fed with the correct information […] the social workers need to be 100% certain when they insert the costs, otherwise the system is worthless." (Manager, Municipality B)

One might speculate that the arrangement with the participation of one particular admin staff at every board meeting is more feasible in small municipalities than in larger ones. In Municipality C – twice the size of Municipality B (with only 25.000 inhabitants) – there is a different working procedure. The admin staff explains the division of labour and its inherent weaknesses:

> "the information goes to Sue in the secretariat, who runs the spreadsheets and pays the bills. The information goes to her when they [the social workers] remember it. They mostly do, but sometimes "Oops, here's a bill we didn't know we had to pay". Obviously, we can tell who sent the bill, but then we're wondering why we weren't told that this service was granted – and then we react. A service can sometimes cost a million! [meaning that it can totally ruin the budget]" (Admin staff, Municipality C)

We again see how the size of the municipality matters. Small municipalities cannot afford a one million kroner surprise. The communication between social workers and admin staff seems to constitute a weak link in the infrastructure. This weak point is sought overcome by new CMSs, which are supposed to automate the information delivery from social worker to admin staff. The admin staff from Municipality A elaborates on the new economy system:

> "the idea is that it can replace the emails from the social workers to us. The social workers are supposed to insert the cost data directly into that system – and from there we're going to extract data. We have to press them a bit to make sure they do it – and that they do it correctly. We're discussing how tough we're supposed to be – and how vigilant. I think some of the social workers are a bit surprised that they're the ones who are actually inserting the data. But there is a wish to get closer to the source. And here I'm thinking that you need to be willing to take a risk, because it's somewhat faulty." (Admin staff, Municipality A)

This expression – getting closer to the source – is often stated as unambiguously good and a way to obtain more truthful data. The logic is that data becomes distorted the more it is handled (be it by machine or human). This suggest a somewhat naïve belief that information on the client, the client's problems and possible solutions just *is* (it flows from the source), instead of being constructed in the dialogue between client and social worker and depending on the social worker's interpretation (a veridical representation of the world). There is also a fracture between the social work approach and the economy approach, which has up until now been somewhat divided, whereas the intention now is to further involve the social workers in the process. This trend is not unique to the disability offices, as it is also seen in other service areas (see, e.g., Schrøder 2014). Expenditure concerns are omnipresent in contemporary welfare states. The disability offices are no exemption. When introducing a new CMS, the concern is displayed in the ambivalence towards caseworkers as the persons in charge of inserting cost data. The fear seems well founded: It does not seem realistic that the majority of caseworkers will begin to consider the inserting of cost data as much as their topic as do the admin staff.

Is this a dagger which I see before me? Perceptions of management information

From descriptions of the information infrastructure – and particularly the part of the infrastructure that is not running smoothly in the background – we now turn to perceptions of the product of the infrastructure. The epistemological point of departure is that the involved actors are making meaning based on their circumstances, "*and that these meanings would be inscribed into their judgments about the built information environment*" (Star 1999: 383). How do managers and admin staff perceive the produced management information? And what are their thoughts on how other actors see it? As Hamlet is uncertain whether or not the dagger is an illusion so is it with the management information, which is perceived as either a material artefact, a trace or record of activities, or a veridical representation of the world.

As should be clear from the previous sections, the production of management information involves many choices and activities from the admin staff. How the management information is produced is in many ways up to them. They often sit alone or with a single colleague and aggregate information. Other actors are usually unaware of how this information is aggregated; they just want the results in number or table form (for example: the average cost of having a citizen in residency is 3 million a year). An admin staff in Municipality C describes how there is a choice to make regarding the level of detail when producing management information. To her, the details are of immense importance:

> 'We've started to use OPUS [an information system handling wages], which gives you the possibility to insert budgets. In relation to this, we've spent a lot of time discussing the value of inserting the budgets. Because the one doing budgets for day care, she's doing it very aggregated; she's just saying "Well, wages constitutes approximately 80% of our spending". Whereas I'm inserting the actual wages for each individual employee on every institution. And I'm thinking, "it wouldn't help me just to say it's approximately 80%'. So I'm saying: 'Then you can fire me and just push a button once a month if that's the kind of management information you want"'. (Admin staff, Municipality C)

This quote shows how the admin staff in municipality C hinges her entire occupation in the organisation on the level of detail that she can provide. Something which is probably not known by the ones receiving her products. This is an example of invisible work according to Star (1999).

This level of scrutiny and detail, however, is not what is the main concern of the management team. The admin staff in Municipality G describes that others do not seem to understand how complex and time consuming it is to produce a number or table. He comments on the perception of management information, which he believes to be dominant: *"in the municipal world, management information is still like 'you just press a button, then we get a table and are good to go'. That's not how it works".* His statement can be interpreted as criticism of the perception of CMSs as neutral intermediary, which transports meaning or force without transforming what it is carrying (Latour 2005: 39). He continues by expressing concern regarding the recipients' unwillingness to view the management information as anything other than a veridical presentation of the world. He says:

> "I've seen several times, not only here, but also other places, that you rather avoid writing you reservations on the management information you deliver. As a technician, I add a footnote saying, "this is what we can say under these conditions etcetera". I know so little about what's going on at the meetings with the local counsellors – I've never been to one- so I don't know why it's not comme il faut to point out the reservations. They just want the results, the tables – and then that's the truth. Consequently, we've sometimes had to say, 'well, this was what we knew at that time. Now we've made an adjustment, so it's more correct'". (Admin staff, Municipality G)

He describes himself as a technician, which is most likely of importance. The information infrastructure is his main concern (his topic, as Star puts it). To others it is either a necessary evil (for social workers) or a mere instrument that serves other purposes (for managers). They are not primarily concerned with the correctness of it – nor how it was made.

The manager from Municipality B, the smallest of the participating municipalities (25,000 inhabitants), comments on the purpose of management information:

> "Management information is very much – but not solely – about informing the upper levels. To be able to inform your managing directors and political level, to be able to very exactly present the key figures and to be able to explain why they look as they do. That's one main thing I use it for; to build confidence with the upper levels. Make them see that what we come up with is no random decision. It's worked up very systematically. Management information is everybody's responsibility. It produces clarity and transparency in the organisation. Very simply put: it gives us overview." (Manager, Municipality B)

The manager does appear to have faith in that their management information is giving a veridical presentation of the office activities. She uses it to demonstrate accountability and to ensure the upper level management's faith in the way she is running the disability office.

In addition to being a navigation instrument, management information is also part of the accountability structures in an organisation and accountability could be considered as infrastructural processes. To do so offers insights such as how admin staff are mainly those concerned with the management information, how it is generated and maintained, and its limitations. Whereas management take the management information (the charts, tables, and reports they are given) at face value. Recalling figures 1 and 2, there is very little direct flow of information between social workers and managers. The admin staff serves as a filter, that aggregates, extracts, and manipulates data from the caseworkers into management information. Such a 'middle man' can be convenient for both the street-level and management level, as

both levels can distance themselves from the management information. The social workers can plead ignorance as to what their recordings are used for while the managers can close their eyes to all of the uncertainties – if, buts, and maybes – saturating the product (table, chart, etc.) they are presented. This being said aggregation is obviously necessary, as management would otherwise drown in details. The point is simply, that this aggregated information is always manipulated (as aggregation is manipulation).

Implications

Social work organisations as many other public organisations are in need of management information, and ICT is used to help produce these. To illuminate the process stretching from when an area is 'digitalised' to the intended outcome of this digitization, namely the 'data-driven decisions' on management level, we set out to expose the infrastructure enabling management information in municipal disability offices. We have done so by focusing on the processes through which social workers' registrations are transformed to management information. This brought our attention to the invisible work of the admin staff, which connects the information obtained by caseworkers with managers in the form of the product 'management information'. When it comes to the final reports and tables the admin staff delivers to management the analysis show that each admin staff have their individual recipe for making management information. This illustrate that the management information is *produced* rather than *collected*. Information is thus not a raw material waiting to be picked up but rather constructed in a network of computer systems and humans. It seems evident that information cannot smoothly and without distortion travel from one end of the organisational hierarchy to another. The notion of 'getting closer to the source' (meaning the caseworker) indicates that information is considered as something caseworkers collect. Whereas this might be the case for some information (such as prices), this is not the case when it comes to information regarding the clients' situation and needs, where several studies show that this is 'negotiated' information (Caswell, Eskelinen & Olesen 2013) and that different caseworkers interpret client categories and recording templates differently (Høybye-Mortensen 2012). Consequently, CMSs are not a neutral intermediary, which transports meaning or force without transforming what it is carrying (Latour 2005: 39). This draws attention to the uncertain conditions for making 'data-driven' welfare organisations. Our analysis shows a complex field of practices where it seems obvious that the human impact is not out of the equation, not even when a CMS is in the picture.

ICTs and particular the new CMS called DHUV offers endless possibilities of aggregation and presentation of the information feed to the system. Therefore, the managers talk about finding the point of equivalence for that simple reason, that the more management information you want to extract from the CMS, the heavier a registration burden you impose on the caseworkers. So, in spite that CMSs often are introduced as a tool to ease the administrative burden, it still costs many resources to produce management information. Furthermore, the ones feeding data in (caseworkers) and aggregating them (admin staff) are not the same persons as the one who uses them (managers). This can make registrations seem unnecessary for social workers as they see their professional tasks laying elsewhere, a problem also seen in regards to inserting cost data. If recording of data is not considered a primary task the recording might be done somewhat random which will reduce the quality of the aggregated data (see also Høybye-Mortensen & Ejbye-Ernst 2017, Høybye-Mortensen 2016).

Another thing to take from the analysis is the transparency issue. In CMSs the algorithms and coding are hidden for the users, which means they cannot look behind the facade. This raises issue of trust regarding the automatically produced management information. The very reason why so many spreadsheets are still in use - even though they require high and manual maintenance - is their transparency. The admin staff can access and alter both coding (formulas) and the inserted data.

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