(Gendered?) Histories:
Tracing the Development of an ICT in the Swedish Rescue Services

Katherine Harrison

Abstract

This chapter charts my investigation of an ICT used by Myndigheten för samhälls-skydd och beredskap (MSB, The Swedish Civil Contingencies Agency) to capture and present data on accidents in Sweden (via a website called IDA). I examine narratives told by project participants who have been involved with the development and ongoing use of IDA, and I suggest how changes to the organisational structure have been entangled with increasing technologisation and a paradigm shift in the role of the rescue services. This leads to a reflection on how these powerful changes can offer a chance to introduce new gender regimes – as well as a risk of reproducing existing gender dynamics.

In our contemporary risk society (Beck 2009), and amid concerns about natural and human threats to national and international security, digital tools have come to play an increasing role in managing information for emergency preparedness. These information and communication technologies (ICTs) respond to national and international anxieties about safety through information control, surveillance, monitoring and statistical modelling. In our desire for preparedness, however, we may overlook the history of these ICTs, how they may affect our understanding of risk and how this intersects with the lived bodies of the public and of emergency service workers.

> Understanding media – despite McLuhan's title – remains an impossibility precisely because the dominant information technologies of the day control all understanding and its illusions. But blueprints and diagrams, regardless of whether they control printing presses or mainframe computers, may yield historical traces of the unknown called the body. (Kittler 1999, xl)

As German media theorist, Friedrich Kittler, points out: our understanding of ICTs is shaped by contemporary ICTs themselves, which often obscure their own development histories, including the social or political contexts in which they were created or the historical background that shaped human-technology interactions and determined which ICTs were adopted into mainstream use. In the above quotation, Kittler suggests, however, that by going back to the documents which show the original idea, design and intention (such as blueprints), it may be possible to gain a better understanding of the contingency of technologies, including reintroducing the lived body into the process. Working within the context of contemporary emergency provisions and starting from the premise that the body is always, already gendered (Butler 1993), I am particularly interested in looking for traces of the gendered body in the process of contextualising and "understanding" technology. Inspired by Kittler's historical focus, this paper charts my investigation of an ICT used by Myndigheten för samhällsskydd och beredskap (MSB, The Swedish Civil Contingencies Agency) to capture data on accidents in Sweden. In particular, I am concerned with taking a critical gender perspective on this aspect of the agency's planning and preparation for emergency situations.

MSB and IDA

In Sweden, the local fire and rescue services are organised and run by the local municipalities. The rescue service duties include both operational work in response to emergencies and emergency preparation work. At the national level, a government agency exists, MSB, with duties related to emergency prevention, preparedness and response in case of emergencies:

> The task of the MSB is to enhance and support societal capacities for preparedness for and prevention of emergencies and crises. When one does occur, we support the stakeholders involved by taking the right measures to control the situation. ("About MSB", MSB website)

Between 2010 and 2012, I explored ICTs in the Swedish rescue services and the role that they play in mediating and sharing information between different stakeholders. More precisely, my research examined a web-based service known as IDA (Indicators, Data and Analysis for protection against accidents) which was designed to share information on accidents with the aim of providing reliable information on risk and safety. This system was developed with input from 11 municipal emergency services across Sweden, is now maintained by MSB and is intended to provide information to the general public and municipal services. As such, IDA forms a bridge between MSB, the municipalities, other national agencies and the public. It plays an important role in supplying information designed to aid emergency prevention and risk assessment, issues which are becoming increasingly important in the work of the municipal emergency services.

This individual project was part of a wider research project for MSB titled 'Gender, Rescue services and Organisation' (GRO) which I conducted with six colleagues. The project team aimed to engage actively with MSB and its employees in working towards building a more gender-equal organisation, through combining interactive research methodologies with intersectional perspectives.

Masculinity, technology and organisational change

Statistics from MSB show that out of the almost five thousand firefighters who are employed full-time in Sweden, only 118 are women ("Fler Kvinnliga Brandman", MSB website). In addition to this numerical gender disparity, the profession in general has been coded as male (Baigent 2005; Chetkovich 1997; Ericson 2004). The connection between masculinity and technology has been elaborated by a number of authors (Cockburn 1983; Faulkner 2000; Hacker 1989; Mellström 1999; Oldenziel, 1999; Wajcman 1991, 2004). Nowhere is this more apparent than in the profession of a firefighter, where proficient use of firefighting technologies (for example, hoses, ladders and breathing equipment) is both a requirement for survival as well as an important means

of performing masculinity in a team context (Harrison and Olofsson, forthcoming).

This study is focused on the intersection of gender, organisation and technology in a context where organisational structures are changing and new technologies are being introduced. Elisabeth Sundin, writing on the introduction of new surveying technologies into the Swedish National Survey, makes the important point that:

> Technological change brings a potential for new gender regimes. Technology in working life has traditionally often been presented as a way of lightening heavy work and creating new possibilities for women. This can be so – but examples of the opposite can also be found (1998, 34).

Bowker and Star's work on organisations and technologies develops this idea further, pointing out that: "New infrastructures do more than support work that is already being done. They change the very nature of what it is to work, and what work will count as legitimate" (2000, 239). With this in mind, my study asked: can the introduction of a new, office-based technology (IDA) offer an opportunity to change the gendered nature of the rescue service organisation?

In their study of gender, ICTs and healthcare, Susan Halford, Ann Therese Lotherington, Kari Dyb and Aud Obstfelder draw on Judith Butler's work about the malleability of gender to emphasise that "(w)hen intertwined with ICT, gender might be done as well as undone" (2010, 20). Firefighting is (like healthcare) a strongly gendered field, with much of that gendering taking place through use of technologies. Using fire-fighting technologies such as ladders and hoses is proof of "appropriate" masculinity, but, equally, the dominant models of masculinity shape what counts as "appropriate" choice and use of tools. Masculinity in the municipal rescue services is expressed primarily through physical strength and dexterity in use of technologies, and the arguments about men's and women's physical strength in relation to these tools have already been widely debated within the rescue services. Proficient use of ICTs, how-ever, does not require the kind of physical strength and dexterity which is synonymous with masculinity in this context. Although ICTs developed

within this context may be permeated with existing organisational gender models, they also may offer a chance to undo the existing models. How then to investigate gender in relation to this new piece of organisational infrastructure called IDA? In order to answer this question, a number of theoretical tools from Science and Technology Studies are deployed in order to understand the socio-historical and organisational context surrounding the development of IDA.

The Black Box

The premise of this study is that the design and use of an ICT system involves certain choices about what information to include or exclude, and also how to process this information. These choices are shaped not only by explicit and implicit user representations (Akrich 1995) but also by the material capabilities of the technologies available at that time. The material capabilities of technologies shape what information can be captured, processed and distributed, and subsequently shape knowledge production and dominant ways of understanding the world (Kittler 1997). Similarly, user representations contain ideas about not only what designers think or know from research about the users, but also assumptions and notions such as socio-historically contingent beliefs about gender. The information that is processed by a system is shaped by these beliefs and capabilities, with important consequences for the future uses of that information. These choices take place in both the development and use of the technology.

In *Science in Action: How to Follow Scientists and Engineers Through Society*, Bruno Latour suggests that technologies or facts can become black boxes, self-contained, opaque entities apparently without history or controversy (1987). This can make it difficult to examine critically a technology. It can be hard to imagine how user representations or material capabilities shaped a technology when one is standing in front of the finished product. IDA is a website which presents data about accidents to the public, municipalities and other agencies. The developers have spent time and effort making the user interface simple and easy to use. How-
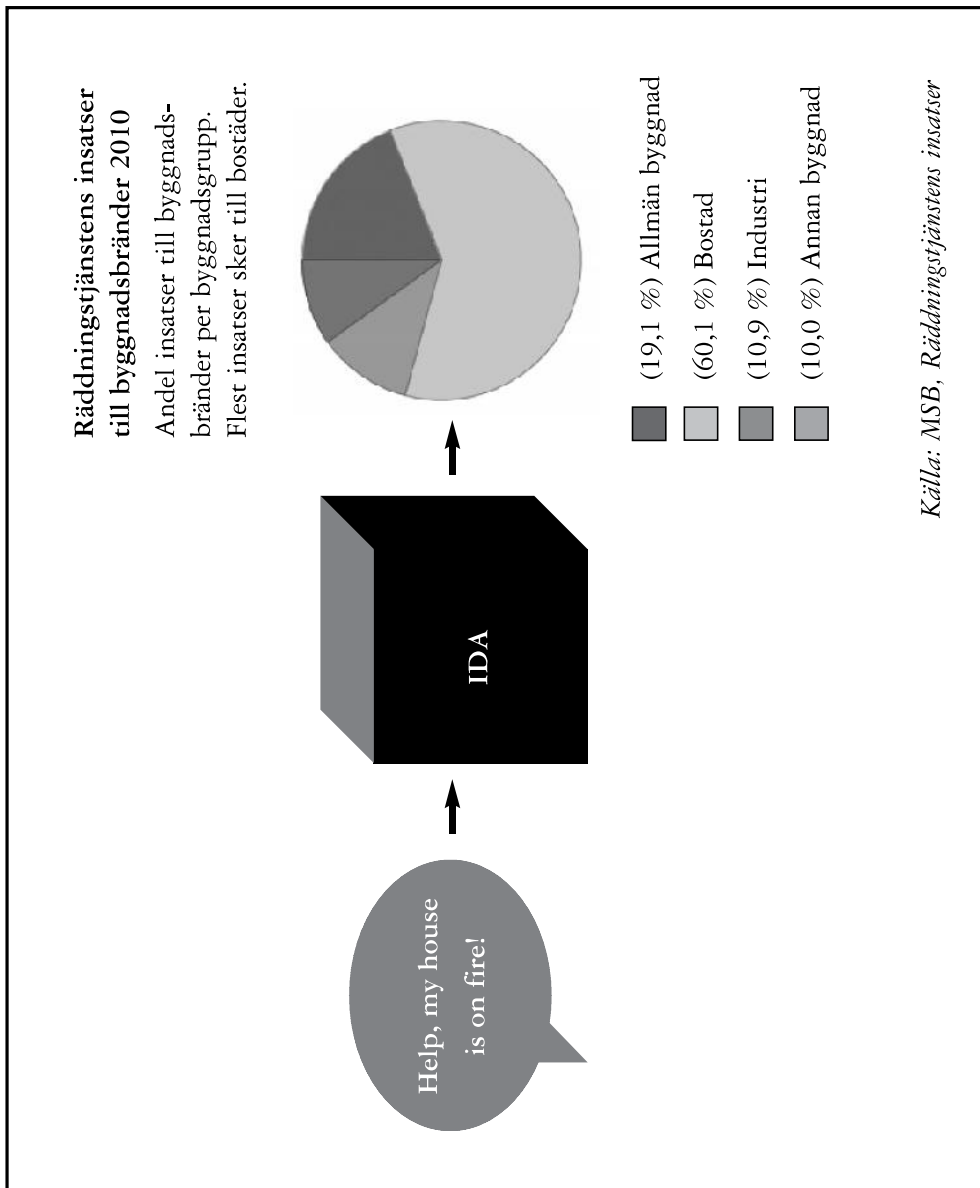
ever, the processing of the data that takes place after a phone call to the emergency services but before the neat presentation of statistics is "hidden" from the user. In this sense, I find it useful to think of IDA as a kind of black box (see Figure 1).

Black boxing something (like IDA) achieves different things. Firstly, it obscures the processes which have been worked through in order to reach the "end product" making it hard to enquire into social/historical/political contexts surrounding the box's creation. Secondly, it simplifies or "tidies up" the "end product" in question. Finally, it works as part of a categorisation process, in which the end product – once tidied and simplified – can be more easily categorised or put into relation with other products. The process of black boxing something involves categorisation – deciding what goes in the box and what should be left out and, as Bowker and Star point out, "(e)ach standard and each category valorizes some point of view and silences another" (2000, 5). In many cases, the black boxing of something both validates it and objectifies it (in the sense that the black box becomes value-free or neutral) (Latour 1987). Therefore, in order to understand what happens inside the black box, Latour proposes looking at the history of the technological development:

> Instead of black boxing the technical aspects of science and then looking for social influences and biases, we realised (...) how much easier it was to be there before the box closes and becomes all black (1987, 21).

Latour suggests following the people who make knowledge and technical artefacts as they go through the process of making the "final", cold object, i.e. to follow them when the artefact is being designed or the knowledge tested and validated. This process reveals the everyday stories and workplace negotiations in which artefacts are created and developed; artefacts become part of a sociocultural context, in which motivations behind specific decisions or assumptions about users can be connected to aspects of the design. Following the designers also reintroduces lived bodies – the artefact is framed as both the result of lived bodies and as having effects upon lived bodies. This approach is useful here because it opens up IDA for investigation of gender norms and assumptions, which may have – consciously or unconsciously – been part of the design process.

Figure 1. The movement of information from emergency phone call to presentation of statistics about different kinds of fires in buildings. The processing of this information that takes place between emergency call and presentation of statistics is represented here as a black box because it is not visible to the end user.

Räddningstjänstens insatser till byggnadsbränder 2010

Andel insatser till byggnads-bränder per byggnadsgrupp. Flest insatser sker till bostäder.

IDA

Help, my house is on fire!

(19,1 %) Allmän byggnad
(60,1 %) Bostad
(10,9 %) Industri
(10,0 %) Annan byggnad

Källa: MSB, Räddningstjänstens insatser

Methods and methodology

Latour's work on following the development of artefacts provides a methodological framework to explore the development and use of IDA. In order to try and open the IDA black box and unpack it, I have tried to "be there before the box closes and becomes all black" (Latour 1987, 21). I have approached this in two ways. Firstly, I have traced the flow of information in the contemporary version of the system. This has entailed talking to participants about how information travels from the initial phone call for help to the municipal emergency services and then into an incident report and on to IDA itself. Secondly, I have also spent time talking to the project manager and those who work with the data management and interface design of IDA to try and understand its history. This paper focuses on the historical development of IDA, from the standardization of the paper incident report form to the current process of uploading data to MSB via computer and the ongoing development of the IDA interface itself.[1]

In 2011, I visited several fire stations, an emergency response centre and the MSB headquarters in Sweden, meeting people who work with IDA in different ways. This included representatives from municipal rescue services, SOS Alarm (the agency who responds to emergency phone calls) and MSB itself. These meetings took the form of semi-structured conversations held mostly in the participants' work places (with the exception of one which took place at Linköping University). The conversations lasted between one and three hours, and all were recorded. The purpose of the conversations was to learn about how information was gathered, processed and moved from one place to another before finally being presented on IDA, as well as to learn about how and why the system was developed, and to discuss possible gender perspectives on the system. Participants were identified through a "snowball" method, with one participant recommending another for their expertise or experience of another part of the process. Following initial email contact, I met with the participants face to face. With the exception of one meeting, all were conducted in Swedish. The recorded conversations were later reviewed, translated and organised into different narratives about IDA.[2]

This project is inspired by interactive research methods. This approach explicitly seeks to disrupt the researcher-researched hierarchy by initiating a more active dialogue with participants. Lennart Svensson and Kurt Aagard Nielsen define interactive research as follows: "Interactive Research stresses the joint learning that goes on between the participants and the researchers throughout the entire research process" (2006, 14). For this reason, I refer to "conversations" rather than "interviews", and these conversations were framed very much as me learning from the participants about IDA. Perhaps inevitably, the participants asked about my project and often the conversations became a more general discussion between us about gender in the rescue services. The material from the conversations was supplemented by an observation in the operations room of an emergency response call centre, early versions of incident reports, the recent Civil Protection Law and internal reports concerning the development of IDA.

Empirical material

The information in this section is drawn from conversations with 4 people: 2 individual meetings and 1 meeting with 2 people.[3] All of them have been involved with the IDA project for many years. The history of IDA was a dominant theme in all three conversations. The information the participants provided has been summarized here. After I had pieced together the following narratives, I sent this text to the participants. I then asked for their feedback/comments. I did this for several reasons: to check basic accuracy, as part of my conversation with the other participants in this project (to offer them a kind of update on my progress and invite their voices in at this stage) and finally, to seek actively dissension and disagreement as a way of opening up what appeared to be the received organizational narrative. In the following, I have not used the names of the individuals but rather identified the separate development narratives through numbering.

Narrative 1: 1996 and standardizing the incident report form

"The first challenge was to decide on the contents of the report form"

Prior to 1996, there were approximately 40 different incident reporting forms because each municipal fire service had its own version of the form. This form was completed by the leader of the watch on returning from an incident, detailing what had happened, how many firefighters attended the incident, who was hurt, etc. These forms were submitted to Statistika Centralbyrån (Statistics Sweden) upon completion. In 1996, a national report was produced highlighting the importance of each municipality reporting the same information about accidents.

In order to design the standardized form interviews were carried out by Statistics Sweden with representatives from the municipal fire services, fire engineers, politicians, representatives from the county administrative board and people who work with fire prevention, transport of dangerous goods, etc. This process determined both what statistics were needed but also what documentation was required when a fire service attended an incident. Following this "needs analysis," a small working group designed the form and tried to agree on "reasonable" definitions for everything on the form, as well as producing a guidance manual about how to use the form. It was this form and manual, which were supplied to all municipal fire services in 1996.

The information captured in this standardized form provides the basis for the design of the incident database (and thus the information available today in IDA). This era also marked the move from paper report forms to online reporting; there was thus a change in both form and content of the reporting during this time. Both aim for standardization and easier management of the information.

Narrative 2: 2003 and The Civil Protection Act

"one must have statistics, one must have national statistics, must have knowledge"

In 2003 a new law was passed called "Civil Protection Act". This replaced the "Civil Defence Act" which had previously dealt with rescue service

work. As the title of this new law suggests, this formalised a move from reactive to proactive work in the rescue services. The new law made clear the chain of responsibility, the necessity for rescue services to plan and also the importance of preventative work with the public (Lag (2003, 778) om skydd mot olyckor).

In response to the changes in the law, two organisations (Nationell centrum för erfarenhets aterföring fran olyckor (National Centre for Learning from Accidents) and also Räddningsverket (Swedish Rescue Services)) were created in 2004. A unit within Räddningsverket made contact with a company called Dimensional Insight with a view to developing a national database to hold all the information on accidents submitted in the standardised incident report forms. This database holds and processes information on accidents. Its user-friendly web-based interface is IDA.

The creation of the IDA website took place as part of broader changes within the organization and the legal framework for emergency preparedness, including a shift from reactive to proactive work and an emphasis on the municipalities' responsibility for emergency planning. In this context, statistics about accidents became the knowledge necessary for developing action plans and budgeting. The creation of IDA was therefore to support municipal rescue services and county councils in their emergency prevention work.

Prior to 2009, IDA was maintained by the National Centre for Learning from Accidents. In 2009 as part of a major reorganisation, this centre was merged with the new national agency, MSB. IDA then became the property and responsibility of MSB. A number of the people from the national centre who had worked with IDA previously continued to work with it after the merger, including the project manager and some of those who design the user interface.

Narrative 3: 2007 and the start of the IDA project

The creation of IDA was in response to a national report about the need for improved evaluation and monitoring in society. The project idea behind IDA was:

to create a web-based information system which can be used to support planning, monitoring and evaluation of protection against accidents in municipalities, county councils and national agencies. The system should also aim to increase citizens' influence on protection through follow-up information (IDA-projektet: Indikatorer, data och analys för skydd mot olyckor – Slutrapport, 3)

This narrative focuses on the development of the IDA portal itself, which was led by a team from within MSB. A "pilot" version of IDA was available in 2007, with representatives from various municipalities invited to test it. The representatives were chosen from a range of municipalities intended to capture a range of different experiences, such as urban versus rural areas. The first full version of IDA went live in May 2008, and was followed by an updated version just a few months later.

In addition to the information collected from the incident report forms, IDA presents data from other agencies, for example on hospital admissions. Some of these organisations charge for the use of their data, whereas others have an agreement with MSB to share data between them free of charge. This creates significant complexity in the system in terms of managing multiple data sources in order to present the information in a single user interface.

The team continue to revise IDA, both the web interface itself and also how information is uploaded into the databases, which feed into the system. The official project report dated 3 December 2008 stresses the need for continued work and development of the system. Despite organisational restructuring in 2009, the team working with IDA remained the same, with the same goals, perhaps suggesting a higher-level agreement within the organisation that preventative tools such as IDA are a priority. During my fieldwork in 2011 another new, simplified version of IDA went live, demonstrating a continued engagement with the service.

Analysis

In the empirical material detailed above, I summarise three different narratives about the development of IDA which participants told me during my fieldwork. None of the stories are exactly the same; each gives

a different emphasis, chronology or explanation. All three are based on conversations supplemented by official, material documents in the form of reports, presentations and forms – which were recommended and supplied by the participants.

The participants start from different time points and focus on different things as being the "key" to understanding IDA. Narrative 1 sees the incident report form and, more precisely, the standardisation of this document as being key to the development, thus this narrative starts from a different time point to Narrative 2, which focuses much more on legal and organisational changes. Both Narratives 1 and 2 give the listener an idea of the "bigger picture". We see the context around IDA itself and the lid of the "black box" opens up for us. Narrative 3 is chronologically the most recent and focuses primarily on the artefact itself. However, this narrative also gives a clear picture of the web of relationships that spread out from IDA both within and outside the organisation. Through these three narratives, it is possible to sketch a picture of both organisational and technological changes. Over a period of 11 years (between 1996 and 2007) significant changes took place, which led to a smaller organisation that was more technologized. This can be seen in the move from paper reporting to online reporting, the creation of the database and the development of the web-based services known as IDA. This suggests rapid, intense technologisation of an organisation, changes which are mirrored in significant organisational restructuring during this period.

All three narratives also included examples of resistance or reluctance towards the technologisation. These included fire stations which continued to use paper report forms, low take-up of the IDA service by the municipality or simply general uncertainty about why the system would be useful. This resistance could be understood as related to unfamiliarity and discomfort with technology or to organisational tensions, but in this distinctive context it is also worth reflecting on a possible gendered aspect to this resistance. IDA is an office-based computer system, in which a firefighter fills in an incident report form and then the forms are automatically uploaded to MSB on a (usually) monthly basis for checking and processing. This information goes into a database which then provides the user-friendly statistics presented on the IDA webpages. These

statistics can then be used by members of the public, employers and the municipality to plan for emergency situations. The whole process can be carried out while seated at a desk. Physical requirements such as strength and dexterity are no longer at the fore, but IT skills become necessary instead. IDA thus represents a significant departure from the "traditional" role of the firefighter as the physically strong, masculine "hero" who rescues people from burning buildings.

The introduction of the Civil Protection Act in 2003 marked a move from reactive to proactive stance in relation to emergency work. This drove a number of changes within the organisation such as an increased emphasis on preventative work in the role of a firefighter as well as technological, office-based innovations such as IDA. This is a significant paradigm shift for the organisation as a whole as well as for the individual firefighters. During fieldwork it was notable that awareness of gender issues was quite high amongst firefighters in terms of a need for strength and expertise in using firefighting technologies (such as oxygen tanks, hoses and ladders), and the perceived difficulties with these for women. The lack of gender balance in the fire service is also openly acknowledged by MSB itself on its website ("Development of equality and diversity in municipal fire brigades," MSB website). However, there was generally much less awareness of how gender issues might be involved in the adoption of new technologies such as IDA. In my conversations, questions about gender often led back to familiar gender stereotypes about the work of firefighters (such as strength). It was not the case that the participants were unhelpful or avoided discussing gender issues with me, rather that they had no awareness of how gender might be connected to use of ICTs in the organisation.

Increased organisational engagement with gender and ICTs in the rescue service is therefore a two-step process. Firstly, it is necessary to raise awareness of how existing organisational gender norms and stereotypes may be reproduced in the design and use of an ICT such as IDA. Secondly, it is necessary to work with the organisation to put strategies in place to ensure gender equality in relation to ICTs. There is a growing emphasis on proactive work within the rescue services and an increasing use of various ICTs across the organisation. MSB promotes its use of ICTs and ICT-

related emergency preparedness on its website, including the agency's participation in Cyber Europe 2012 ("MSB participated in Cyber Europe 2012"), ongoing work in information security ("The MSB and societal information security") and its digital communication system, Rakel ("Rakel – more than just a robust digital communications system"). It is notable that there is no reference to gender equality or diversity in any of these public resources concerning ICTs, indicating a broader organisational lack of awareness about the intersection of gender and ICTs. This "new" aspect of rescue services equality work should not be ignored any longer.

Conclusion

When trying to develop gender perspectives on an organization such as MSB, it is important to consider not only the more obvious, public face of the organization such as municipal fire and rescue services, but also the management tools which connect the different parts of the organization and provide information for the planning and budgeting around emergency preparedness. Given the increasing use of ICTs to support, predict and plan rescue services work, it is both relevant and timely to take a gender perspective on ICTs within the rescue services. Use of these technologies has the potential to change working conditions and identities of rescue services employees. For example, ICTs might instigate a shift towards more indoor, desk-based work. What would this mean for an organization where the successful performance of masculinity has been strongly linked to physical strength and outdoor work? The implementation and use of ICTs within the rescue services also means a shift in how "customers" might be understood and their needs modelled, budgeted for and predicted. As such, tools like IDA can reasonably be understood as central to contemporary organisations, but how might they be shaped by social or organizational influences and biases? In order to answer these questions, I here suggest approaching IDA as a black box, as a website that provides information on accidents but which obscures the means by which this information is collected, processed and distributed, and the development behind the system.

In this paper I have examined narratives told by participants who have been involved with the development and ongoing use of IDA, and I have suggested how changes to the organisational structure have been entangled with increasing technologisation and a paradigm shift in the aim of the service. I have reflected on how these powerful changes can offer a chance to introduce new gender regimes – as well as the risk of reproducing existing gender dynamics. Examining the narratives that were told shows a consistent lack of knowledge about gender in relation to ICTs in the Swedish rescue services; the absence of gender knowledge in relation to IDA is not a sign that the system is "free" of gender issues, but rather that there is no awareness of, or knowledge about, gender in this context.

Notes

[1]   These two approaches are more complimentary and entangled than perhaps this neat separation between development history and contemporary information movement suggests. However, for reasons of space, I am focusing here solely on the historical "unpacking" of IDA.

[2]   Although great care was taken in translating what the participants said, it should be made clear that any errors in the translation are mine alone.

[3]   Many thanks go to the participants in this study, both at MSB and in the municipal rescue services, who gave their time to talk about IDA with me, passed on supplementary materials and recommended me to others who had experience of the system.

References

Akrich, M. (1995), 'User Representations, Practices, Methods and Sociology', in Rip, A., T. J. Misa and J. Schot (eds.), *Managing Technology in Society: The Approach of Constructive Technology Assessment*, London: Pinter, 167-185.

Baigent, D. (2005), 'Fitting in: the conflation of fire fighting, male domination and harassment', in Gruber, J and P. Morgan (eds.), *In the company of men: male dominance and sexual harassment*, Boston: Northeastern University Press, 45-64.

Beck, U. (2009), *World at risk*, translated by Cronin, C., Cambridge & Malden, MA: Polity Press.

Bowker, G. C., and S. L. Star (2000), *Sorting Things Out: Classification and its Consequences*, Cambridge, Mass. & London: MIT Press.

Butler, J. (1993), *Bodies that Matter: On the discursive limits of "sex"*, New York & London: Routledge.

Chetkovich, C. (1997), *Real Heat: Gender and Race in the Urban Fire Service*, New Brunswick & London: Rutgers University Press.

Cockburn, C. (1983), *Brothers. Male Dominance and Technological Change*, London: Pluto Press.

Ericson, M. (2004), *Brandman och man. Om aktualisering av kön i brandmannayrket.* [*Being a fire fighter and a man. An account of gender in the profession of a fire fighter*], Gothenburg: Räddningsverket och institutionen för genusvetenskap, Göteborgs universitet.

Faulkner, W. (2000), 'The power and the pleasure? A research agenda for "making gender stick" to engineers', *Science, Technology & Human Values* 25: 87- 119.

Hacker, S. (1989), *Pleasure, Power and Technology*, London: Unwin Hyman.

Harrison, K. and J.Olofsson (forthcoming), 'Prosthetic relations – intra-corporeality of firefighters and their technologies'.

IDA website, _http://ida.msb.se_ [29 November 2012]

Kittler, F. (1997), *Literature Media Information Systems*, ed. and intro. by J. Johnston, Amsterdam: G+B Arts International.

Kittler, F. (1999), *Gramophone, Film, Typewriter*, trans. and intro. by Winthrop-Young, G. and M. Wutz, Stanford: Stanford University Press.

Latour, B. (1987), *Science in Action: How to follow scientists and engineers through society*, Cambridge, Mass.: Harvard University Press.

Lag om skydd mot olyckor [Civil Protection Act], (2003; 778), _http://www.notisum.se/ Pub/Doc.aspx?url=/rnp/sls/lag/20030778.htm_

Mellström, U. (1999), *Män och deras maskiner* [Men and their machines], Nora: Nya Doxa.

MSB, 'Fler kvinnliga brandmän - men det går långsamt' [More women firefighters – but only gradually], _https://www.msb.se/en/Start1/Nyheter-fran-MSB/Nyheter ---Mangfald/Fler-kvinnliga-brandman-men-det-gar-langsamt/_ [29 November 2012]

MSB, 'Development of equality and diversity in municipal fire brigades', _https://www. msb.se/Upload/English/About_MSB_fact/Development%20of%20equality%20 and%20diversity%20in%20municipal%20fire%20brigades.pdf.pdf_ [29 November 2012]

50   *Katherine Harrison*

MSB, 'About MSB', _http://www.msb.se/en/About-MSB/_ [29 November 2012]

MSB, 'MSB participated in Cyber Europe 2012', _https://www.msb.se/en/Tools/News/ MSB-participated-in-Cyber-Europe-2012-/_ [29 November 2012]

MSB, 'Rakel – more than just a robust digital communications system', _https://www. msb.se/Upload/English/About_MSB_fact/Rakel_robust_communications_sys- tem.pdf_ [29 November 2012]

MSB, 'The MSB and societal information security', _https://www.msb.se/Upload/ English/About_MSB_fact/Societal%20information%20security.pdf_ [29 No- vember 2012]

Oldenziel, R. (1999), *Making technology masculine: men, women and modern machines in America 1870-1945*, Amsterdam: Amsterdam University Press.

Räddningsverket (2008), *IDA-projektet - Indikatorer, data och analys för skydd mot olyckor (Slutrapport)*. Dnr.623-1618-2007

Sundin, E. (1998), 'Organisation conflict, technology and space: A Swedish Case Study of the Gender System and the Economic System in Action', *Gender, Work and Organization* 5(1): 31-42.

Svensson, L. and K. A. Nielsen (2006), 'Action Research and Interactive Research', in Nielsen, K. A. and Svensson, L. (eds.), *Action Research and Interactive Research: Beyond practice and theory*, Maastrich: Shaker, 1-45.

Wajcman, J. (1991), *Feminism Confronts Technology*, London: Polity Press.

Wajcman, J. (2004), *Technofeminism*, Cambridge: Polity Press.