Employees' vulnerability – the challenge when introducing new technologies in local authorities

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Abstract. While it is well-known that the implementation of new technologies requires appropriate technical capabilities, research has for a long time almost neglected the behavioural capabilities of organisation's employees to adopt innovative technologies. Employees have to trust new technologies and thus, to be willing to become vulnerable when they adopting it as they have to cope with something they are not familiar with. This paper highlights the challenge for local authorities to cope with employees' unwillingness to become vulnerable when it comes to implementing new technologies in local authorities. Based on semi-structured interviews that have been conducted under the umbrella of the European project SUITS, we were able to identify two indicators for the unwillingness of employees to adopt new technologies - incongruence of values and attribution of negative motives. Furthermore, we show best practise examples how to overcome the negative consequences of the unwillingness to become vulnerable and to be able to implement new technologies successfully in the long-run. Our practical implications in the end are derived by the experiences when introducing new technologies in the partner cities of the SUITS project.

Keywords: distrust, local authorities, new technology adoption, trust, vulnerability, mobility planning

1   Introduction

Since years local authorities are faced with a variety of political and societal requirements and restrictions in relation to future sustainable mobility planning. On the one hand, the mobility field has undergone significant changes in recent years and is becoming increasingly complex, for example numerous innovative forms of mobility and service providers entered the market. On the other hand, citizens' mobility requirements changed enormously. Due to recent trends such as 'Fridays for Future', citizens require sustainable thinking and prefer resource efficient ways of travelling.

Many of these changes and challenges are associated with the use of new technologies for local authorities. In recent years, the term Smart City has gained high popularity and the mobility sector benefits greatly from new technologies. Local authorities started for example to collect status data by innovative sensor technology to allow for better service organization (e.g. public transport, parking management) to meet the citizens'

requirement on the one hand but also to be able to use the data for analysis, evaluation and further development of mobility services. However, the implementation of these new technologies has become a major challenge for local authorities, in particular for small and medium sized cities, which do not have the same amount of time, men/women power and budget like bigger cities. Challenges associated with the use of new technologies threats public sector employees in a number of substantive ways and made them feeling more vulnerable. The willingness to become vulnerable is urgently required when people have to cope with technology they are not familiar with as they have to have the positive expectations that this new technology will not harm them in the long-run [e.g. 1]. These two aspects, having positive expectations towards a new technology and the willingness to become vulnerable when adopting and actual using new technologies, are the key elements of trust [2; 3]. Employees in local authorities have to trust new technologies when local authorities want to implement them successfully [1] .

When employees are not willing to become vulnerable and may not share positive expectations with a new technology, it has been shown that it is very likely that distrust may occur. Following Bijlsma-Frankema and colleagues [4] distrust is a psychological state, comprising the unwillingness to accept vulnerability, based on negative perceptions and expectations. Thus, distrust is in our context the unwillingness by individuals to become vulnerable and the expectation that a technology may harm.

In the literature distrust has been connected to a variety of negative consequences such as a lack of cooperation [5], the avoidance of interaction [6], or the unwillingness to share knowledge or information [4]. Distrust can therefore be conceptualised as an unrecognised and neglected hazard that derives from feelings of vulnerability, which consequently stifles knowledge-exchange and relationship building between parties. Thus, tackling distrust is crucial for forecasting people's attitudes and behaviours and therefore for accepting and adopting new technologies in local authorities [e.g. 7].

This paper highlights the relevance of employees' willingness to be vulnerable when local authorities want to implement new technologies successfully. Thus, we present a unique approach to hazard and resilience when introducing new technologies for future mobility planning in local authorities by using research from psychological and business-related scholars to re-imagine them as issues of distrust, understood via attention towards lived experiences of vulnerability. We adopt a sociotechnical approach to change in our paper. This approach is based on the sociotechnical systems theory that recognises the importance of behavioural change when implementing technological innovation [e.g. 8; 9; 10]. We want to outline how distrust as key obstacle was overcome by different public authorities to cope with the required behavioural change in the frame of the SUITS project.

Based on semi-structured interviews with different local authorities in Europe we will present best practise examples how to enable local authorities to reduce employees' vulnerability, enhance their employees' resilience and foster organisational innovativeness. Herewith, we contribute decisively to research but also to management in the field of public administration. The structure of the paper is the following. We will start to outline the theoretical foundation of vulnerability when trying to introduce new technologies in an organisation. Afterwards we will describe the negative consequences of

the unwillingness to become vulnerable by local authorities employees and the development of distrust before we show examples of how four European local authorities managed to overcome the unwillingness to become vulnerability and to avoid or minimize distrust inside the organisation successfully. Finally, we want to describe clear best practises along different case studies from the field that show the outcomes and the learnings for other local authorities in Europe and worldwide.

2 Theoretical perspective

2.1 Internal challenges for Local Authorities

The implementation of new technology is constantly bringing new challenges for local authorities, in particular in relation to future sustainable mobility planning. Local authorities have to become more effective and resilient to new technologies and/or simply new ways of working. However, most change programmes that focus solely on technological or/and technical change and thus, highlighting primarily the importance of trainings and seminars to enhance employees' abilities to cope with these innovations, and are still ignoring the importance of social and behavioural aspects, end up by failing [e.g. 1; 11].

One of the key reasons for failing might be the individual's vulnerability when it comes to the implementation of new technologies. Indeed, employees' vulnerability has been overseen by researchers and practitioners for many years [3]. So far vulnerability has typically mentioned in relation to trust in the management and psychological literature since scholars in these fields see the willingness to be vulnerable as one core aspect when defining trust, but not in relation to the introduction of new technologies in organisations. Rousseau et al. [12] define trust as the individual willingness to be vulnerable based on positive expectations that another party will not take advantage of this vulnerability. In relation to the implementation of new technologies, trust has to be defined as the individual willingness to be vulnerable based on positive expectations towards the new technology and its benefit for the individual. While the first key element of the trust definition "the willingness to be vulnerable" has been identified as the rather affective side of trust, the second key element "positive expectations" is called the cognitive side of trust [3].

To show the development of the concept of vulnerability, we firstly have to refer to the United Nations [13] which describing how general categories of factors determine a community's level of vulnerability. Beside this rather macroeconomic perspective on vulnerability, we align with the findings of Nienaber and colleagues [3] that one of the most dominant streams of research on vulnerability can be found in medical sciences. Here, vulnerability describes an individual's inability to protect and maintain her/his interests [14]. In context of sociological factors, Chambers [15] explained vulnerability by two indicators: external threats and a lack of internal coping mechanisms. While the external threat can be described as the implementation of new technologies in organisations, the complexity of potential service providers (stakeholder) and technological

solution for becoming a 'smart city', the later one is of key interest as this lack of internal coping mechanisms may be driven by the unwillingness to become vulnerable and missing positive expectations towards the new technology.

To address the affective side of trust in terms of willingness to be vulnerable, we further refer to sense-making theory that suggests that risky experiences such as unfamiliar situations are characterized by negative feelings in the form of disorientation or foreignness. Following Weick and colleagues [16], the key question related to sense-making is 'same or different?' As long as something seems to be similar to something well known already, individuals perceive it as less risky and thus, rather related to positive feelings. Meaning, when a new technology has to be implemented in a local authority and it is perceived as rather familiar by the local authorities' employees as it can be connected to something well known already, the implementation and the actual use of the new technologies is very likely. Whereas, something that is not known and absolutely new, might be very likely perceived as threatening and thus, employees do not want to become vulnerable and thus, are not going to actual use it with the consequence that the implementation will fail. While the majority of research in this area focuses on how awareness of a specific situation is formed and categorized, and how these processes influence individual's actions, little attention has been paid on the introduction of new technologies in an organisation in particular.

2.2 Employees' unwillingness to become vulnerable and it's negative consequences for the introduction of new technologies

In line with trust research and recent definitions on distrust, the unwillingness to become vulnerable is one key element of distrust next to the expectations that – here – new technology may be harmful. Distrust research has gained enormous attention in psychology in recent years [e.g. 17; 18]. Research shows since years impressively the negative consequences of distrust that will harm organisations when trying to implement new technologies. Scholars highlighted for example: diminished cooperation [19; 20] or the avoidance of interaction [6; 4; 21]. The rationale for the reduced willingness or unwillingness to cooperate as an effect of distrust is that it results from an accumulating and reciprocal diminished willingness to act cooperatively. Avoidance is another documented effect of distrust and refers to attempts to reduce or prevent future harm. Furthermore, scholars were able to identify less knowledge sharing in organisations, enhance levels of knowledge hiding and increasing amounts of conflicts inside an organisation [22]. All these consequences will become real obstacles when trying to introduce new technologies in local authorities. The unwillingness to interact with the new technology and the unwillingness to act cooperatively with the top management of a local authority will hinder a successful implementation of new technologies as the employees will not adopt and use the new technology in the end. Even worth, employees may perceive the new technology has harmful and thus, distrust may flourish inside the organisation and lead to a distrustful climate in the whole local authority and herewith affect all levels inside the organisation but also maybe spread to the wider stakeholder relationships (pervasiveness of distrust [4]).

3 Empirical analysis

3.1 Method and Sample

Our data was gathered via in-depth semi-structured interviews each lasting around one to two hours. Our sample consists of four local authority partners in Europe, comprising the local authorities and their wider stakeholder network in Kalamaria (Greece), Valencia (Spain), Alba Iulia (Romania), Rome and Turin (Italy) and West Midlands (UK). These local authorities have been chosen because they are partners in the SUITS project and therefore are currently on a change journey that involves the adoption of new technology and working systems. The SUITS project is a four-year research and innovation action, intending to increase the capacity building of local authorities and transport stakeholders and to transfer learning to smaller sized cities, making them more effective and resilient to change in the judicious implementation of sustainable transport measures. In total we were able to collect information of 12 different individuals – all connected to the local authority partners we worked with over the period of 3 years. All of these interviews were conducted either in participants' workplaces or during video conferences, audio recorded and transcribed in full.

3.2 Data analysis

The transcribed interviews were coded according to a priori codebook, developed from a rigorous literature review on employees' vulnerability when introducing new technologies in local authorities. In a first step we checked for the existence of actual unwillingness to become vulnerability, before we run in a second step the analysis to identify indicators and consequences of the existent unwillingness to be vulnerable. After an initial scoping exercise for the fit of the identified indicators for vulnerability when it comes to the implementation of new technologies, we run a thematic analysis to identify the key indicators for the unwillingness to become vulnerable and the major negative consequences from it. Thus we included codes for distrust and trust as belief and as behaviour [4; 18], and "trustworthiness" as well as 'distrustworthiness' (e.g. incompetent, self-interested, exploitative, volatile, opportunistic).

We coded the data at the explicit, rather than implicit, level, and organised our results thematically, based on the patterns which emerged from the discourse [23]. In this way we progressed from deductive 'first-order codes' to inductive 'second-order themes', guided as appropriate by useful coding (such as that listed above) and thematic terminology found in similar studies [4]. Our findings section constitutes the most frequently found themes in relation to our research aim and theoretical framework.

4 Results

The first section of the results show how we investigated whether employees' vulnerability is actually present in the local authorities or not (step 1 of the analysis). The second section will highlight the key themes that emerged out of the data in terms of indicators that fostered the unwillingness to become vulnerable and its negative consequences in the local authorities when it comes to the implementation of new technologies to foster sustainable mobility.

4.1   Existence of employees' unwillingness to become vulnerable

The interview partners made it very clear that one of the key obstacles for the successful implementation of new technologies is the unwillingness to become vulnerable by the majority of employees. Most employees felt uncomfortable using and adopting new technologies they are not familiar with. Taking the idea of sense-making theory into account, we can assume that those situations are perceived as "risky" by the employees and thus, lead to a rather negative feeling of not willing to become vulnerable. Even more, some interview passages seem to indicate a real unwillingness to become vulnerable as employees really distrusted new systems of working with each other such as open data systems, information systems for traffic, parking, or air quality. Here, we could spot a tendency of not willing to cooperate with stakeholders that required data for their forecasting analyses for example as they distrusted the technology whether they benefit from it in the end or not. One quote for example was "I am not familiar with that technology and I do not understand the benefit of it except that I have to invest time and effort and giving the data away – and how do I know what you are going to do with the data in the long run?" [local authority 4, representative from transport department]. This behaviour can be sort as indicator for the existence of the unwillingness to become vulnerable and negative expectations and thus, show tendencies towards distrust in the technology.[i]

Afterwards we undertook the thematic analysis (step 2). Two indicators could be spotted based on the interview data that was conducted during SUITS and two major negative consequences will be presented in the next two sections.

4.2   Key indicators for employees' feeling actual vulnerable in local authorities

Perceived value incongruence. Perceived value incongruence has been defined as "the belief that others adhere to values that are perceived as incompatible with the actor's core values" [4]. Thus, in that moment when an individual identifies that its own values are not compatible with the values of someone or something else, the unwillingness to become vulnerable emerges. Perceived value incongruence has been proposed as a determinant of negative perceptions and expectations of the trustee's motives and behaviors in studies of professionals [24] which we could for example observe while working with the local authorities. One typical example in the following: the majority of local

authorities failed explaining a potential supplier how the particular technological requirements should look like in detail due to a lack of specific technological expertise. The supplier (stakeholder) perceived such a behaviour very likely as unwillingness to become vulnerable as the supplier would assume the local authority does not want to provide the detailed information that would be needed to make a sufficient offer to the local authority. The consequence is that the supplier has to offer a technology that may perceived as rather a generic technological solution by the local authority due to the missing detailed information. The local authority in turn may recognize the fact that a rather generic product solution has been offered. This perception of the local authority may very likely feed the unwillingness to become vulnerable and foster negative expectations such as "the supplier does not really care about us. They just want to sell their product." [local authority 3, representative of the mobility department].

The next example also shows the negative circle of a perceived value incongruence between different stakeholder and local authorities when new technologies are requested by the local authority to cope with sustainable mobility. Two stakeholder during SUITS tried to convince the local authorities to share data with them for the purpose of testing a new system for handling big data. However, the unwillingness of the local authorities to share the data was driven by different underlying value systems of the involved parties. While the local authorities could not understand the reasons and benefits of the new technology for which they had to provide data, they suspected the motives of the two stakeholder companies. They raised concerns regarding the confidentiality of data and the long-term use of the data when they provide the data to the private companies. One statement was for example "We expect that we have little in common with the other and that the other intentions are different to ours in the long run. Maybe that can harm us sometime." [local authority 2, representative of the mobility department]. Distrust arises as others come to be characterized as unpredictable and threatening, thus fostering a sense of uncertainty and vulnerability [25].

Attribution of negative motive. The attribution of negative motives can be also an indicator for distrust that we found in our data. Attribution is the process through which people try to explain their own and others' behaviors [26; 27; 28]. The proposed relation between the unwillingness to become vulnerable and motivational attributions is built on the notion that individuals feel the urge to interpret behaviors of others that are salient to self, such as harmful behaviors. Our data indicated several aspects that may be summarized as attributions of negative motives. Negative experiences with new technologies in the past foster such attributions. A once failed new technology will thus increase the attributions of negative motives and foster distrust towards innovations. Several interview partners referred to such negative experiences in the past. Either the technology was not well developed or the technology was very weak introduced by the top management in the local authority. Another example was a rather poor introduction of the new technology in the organisation. As long as the employees of the local authorities did not understand their benefit of the implementation of the new technology or at least the benefit for the citizens', they developed an unwillingness to become vulnerable as they expected rather negative motives in relation to the technology implementation. "I do not really understand how this should help us and how we can benefit

from it. Thus, what are the motives behind the introduction of this technology in our department? I suspect anything positive."[local authority 2, representative of the mobility department]. Sometimes the local authority failed to implement the new technology and the organization moved back to the old ways of working. Such negative experiences even strengthen the attributions of negative motives in the future and increase the likelihood that the unwillingness to become vulnerable emerges in relation to new technologies.

4.3 Negative consequences of the unwillingness to become vulnerable in local authorities

Avoidance of interaction. One of the key outcomes of the interviews has been the fact that the unwillingness to become vulnerable lead into the avoidance of interaction – in particular local authorities tried to avoid to interact with the new technology at all. This finding is in line with several findings in the field of trust research [e.g. 6; 21]. The interview partners referred to several examples that fostered their unwillingness to become vulnerable and thus, lead to distrust towards the new technology. For example, when employees have been disappointed in the past as their positive expectations towards new technologies have been not proven right, they became skeptical next time and tried to avoid to interact with that new technology and the whole implementation process. "We tried to not to be involved with the top management that wanted us to test the new technology. You know last time we put so much effort in it and I still do not see the benefit for us."[local authority 1, representative of the mobility department]. A new technology cannot be implemented by the local authority's top management alone as then the implementation would fail. The top-down approach only works if it gets a bottom-up support by the wider local authority or the wider group of stakeholder. For example, Alba Iulia was able to implement new guidelines for procurement, but without working trustful with their stakeholder, this new process would have not been successfully implemented in the long run. As the local authority and the private providers worked close together and were willing to become vulnerable towards each other, they were empowered to implement these guidelines successfully.

Lack of knowledge sharing. Another negative consequence of the unwillingness to become vulnerable is an identified lack of knowledge sharing which was mentioned several times by the local authorities in line with SUITS. West Midlands Combined Authority put this point on the top of their agenda as it is very decisive for the organisational success, in particular organizational performance. Organisations spent for example almost a trillion dollars annually to analyze, store, and retrieve knowledge [29]. The willingness of employees to share knowledge depends on the level that these employees trust the organisation, colleagues or the other stakeholders [e.g. 30; 22]. While technology is able to store explicit knowledge, tactic knowledge cannot be stored in technologies as it resides only in the minds of people and its availability depends upon their decisions and behaviours [22]. Thus, when employees start to distrust a new technology they are not willing anymore to share their experiences with that technology, or

their learnings [31]. These aspects are very important for the future developments of new technologies. Even worse is the negative culture that may evolve from the unwillingness to share information and knowledge due to the fact employees may distrust a new technology. Employees may likely feel more and more isolated and becoming less motivated which leads to lower levels of organizational performance in the long-run [1].

4.4 Guidelines to avoid the emerge of unwillingness to become vulnerable

Be transparent and honest. One learning from our work during SUITS has been the fact that local authorities have to become more transparent when searching for the best technological solution. Local authorities should communicate honestly and maybe even show evidence that they are not able to provide detailed information as they do not have the technological expertise. On the other hand, suppliers must put more energy into understanding exactly what requirements, expectations and uncertainties exist on the side of the local authority.

Communicate face-to-face. Try to meet face-to-face with potential suppliers as this allows trust to emerge between the negotiating parties (individual level) which may allow for trust transfer to the technology (human-technological level). It was said in the interview that face-to-face meetings are the best way to develop a trustful relationship with each other that will affect future decision-making.

Get a third party on board. Sometimes it may help to ask as a local authority for external support by former suppliers or experts when decision have to be made regarding the implementation of new technologies. While the education system usually has to be independent and less cost intensive as consultancy companies, the recommendation is to work closer with the academic expertise that is needed. This may be the technological side of a new product or service or the human behavioural side when it comes to the employees in local authorities that have to adopt and use the new technology.

Foster knowledge exchange with other local authorities. As local authorities often times do not have the budget to hire expensive consultancy companies, an alternative could be a learning group. During SUITS such a learning group was set up in which Valencia asked the West Midlands Combined Authority to support them in their recent developments. In addition, Coventry City and Coventry University joint the team to allow for a trustful and fruitful knowledge exchange in the future.

Create a guiding coalition that serves as project management. Development of a clear vision and definition of goals, how the new technologies and data should contrib-

ute to making processes more efficient. Most important as well to identify one key person that serves as role model for others and is able to motivate and convince colleagues to support the implementation of the new technology.

Understanding political interests and affecting political decisions. A clear understanding of what the technologies are needed for and what they are supposed to deliver makes it easier to influence decision makers and obtain the necessary financing.

5   Conclusion

This papers highlights the relevance of the employees' willingness to become vulnerable when new technologies are implemented in local authorities. As long as employees are not willing to become vulnerable when adopting a new technology and to expect the new technology to be harmful, the introduction of new technologies in local authorities will fail. Based on comprehensive transcript material and observations during the project SUITS, we are first, able to show two key indicators that foster the unwillingness to become vulnerable and thus, may be the reason for a failing introduction of a new technologies in local authorities. Second we demonstrate two major negative consequences, a lack of knowledge sharing and the avoidance of interaction, due to the unwillingness of the local authorities' employees to become vulnerable. Finally, we are able to provide practical guidelines to avoid the emerging of an unwillingness to become vulnerable which path the way to a successful introduction of a new technology in a local authority.

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[i] In the transcripts, we made sure that the participants referred to the new technology they distrust and not the company or stakeholder behind the technology. This is important as research shows that we have to differentiate between levels and targets of trust respective distrust (Fulmer & Gelfand, 2012).