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Research paper

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Abstract

Research on information system (IS) adoption and resistance has accumulated substantial theoretical and managerial knowledge. Surprisingly, the paradox that end users support and at the same time resist use of an IS has received relatively little attention. The investigation of this puzzle, however, is important to complement our understanding of resistant behaviours and consequently to strengthen the explanatory power of extant theoretical constructs on IS resistance. We investigate an IS project within the healthcare sector in the UK in which end-users, who were heavily involved during the design, implementation and roll out, expressed their support for the system, while simultaneously showing resistance. To examine this behaviour in detail, we applied Q methodology. As a result, we identified three different groups: (1) The convinced connector, waiting for collaborators. (2) The savvy explorer, sceptical about the tools' benefits. (3) The ambivalent follower, overwhelmed by complexity. While the behaviour is similar across all three groups, the reasons for not using the system differ significantly. Based on these groups, as our main contribution, we explain the paradox of supportive non-use. We further add a fine grained understanding of supportive non-use to the existing types of IS resistance.

Keywords: Resistance, typology, supportive non-use, healthcare, Q-methodology

1 Introduction

Common sense would probably expect that someone who generally supports an information system (IS), for example because they participated in the identification of use cases for a new IS and advised during the system's design and development, would later quickly become an active and supportive user of this software. However, as we are going to show in this paper, this cannot be taken for granted. Though research on IS adoption and resistance has accumulated substantial theoretical and managerial knowledge that explains why people accept or reject IS, still the paradox that people who support and at the same time resist usage of an IS turns out to be puzzling and may explain some of the still high failure rates of IS implementations (Dwivedi et al., 2015). However, contemporary IS usage behaviours seem to even further complicate understandings of IS acceptance and resistance, as individuals may nowadays use a particular IS, but reject a similar one or be an IS adopter in their work life, while trying to minimise IS use in their private space (Köffer et al., 2015, Laumer et al., 2009).

System usage is at the core of IS acceptance research (Van Offenbeek et al., 2013) and it is widely accepted that under-utilisation of an IS puts the underlying business case at risk (Tennant et al., 2013). Hence, it is critical to understand why individuals do not use an IS as planned or even refrain from using it at all. Non-use, as a phenomenon, has attracted some interest from researchers (e.g., Selwyn, 2003) and is continuously conceptualised as behaviour (e.g., Choudrie and Zamani, 2016, Laumer and Eckhardt, 2010, Van Offenbeek et al., 2013).

In an attempt to integrate the concepts of IS acceptance and resistance, researchers propose a two-factor framework, in which both factors are defined as continua (Van Offenbeek et al., 2013). The first dimension, stemming from research on IS resistance, represents the degree of support or resistance a user is displaying. The second dimension, consequently inherited from IS acceptance research, quantifies acceptance between the extreme values high use and non-use. While it is intuitively understandable that individuals support and use or resist and do not use IS, we focus on the less clear combination of support and non-usage of an IS. Thus, the research question for our study is as follows:

How can the paradox that end users are positive about design, usability, usefulness and job fit of an IS, while simultaneously resisting its use, be explained?

Answers to this question are relevant for two main reasons. First, they complement our theoretical understanding of resistant behaviours. This is important, as in order to meaningfully apply a theory for describing, analysing, explaining, predicting or designing, the theoretical model should consider the richness of the phenomenon under study, such as characteristics of individuals or groups (Doty and Glick, 1994, Gregor, 2006). Second, managers need to be aware of manifold threats that jeopardise a successful IS implementation and mitigate the risks (Avison et al., 2006). However, due to the paradoxical nature of the user behaviour at hand, they might be seduced to underestimate the degree of resistance likely to be encountered and fail to adopt appropriate coping strategies. Therefore, raising managerial awareness of this type of resistance is important.

In this paper, we report on findings from a pilot implementation of collaborative tools designed to support healthcare professionals in cross-organisational and team working and informal learning. In order to ensure high acceptance of the tools, the pilot followed a user centred design approach (Pea, 1987) and involved prospective users throughout all phases, such as design and implementation. However, following the deployment of the tools, usage remained very low over the whole pilot period of six months, though the healthcare professionals provided consistently positive feedback about the tools, including their usability, functionalities and benefits. Although we assumed, on the basis of our observations, that the reasons for this contradictory user behaviour could be grouped into a number of prototypical explanations, we had no working hypothesis about such a structure. Therefore, we followed a Q methodological approach, as this methodology is designed to reveal individual viewpoints, as well as to identify shared points of view, if these are present (Brown, 1980). Furthermore, Q methodology is well equipped to gain deep insights into user and group attitudes, while at the same time minimising researcher bias (Klaus et al., 2010, Thomas and Watson, 2002).

The paper is structured as follows. In the next section, we briefly describe the most prominent theories on IS acceptance and resistance (section 2). After explaining the context of the study and the Q study as our methodology (section 3), we present our results in section 4. We then discuss our results (section 5) and conclude with formulating limitations and potential avenues for future research (section 6).

2 Theory and related work

Our understanding of information system acceptance is widely regarded as mature in IS research (Sykes et al., 2009, Williams et al., 2009). Most research on this topic aims to explain or predict the usage of an IS and to identify influencing factors (e.g., Davis, 1989, Venkatesh et al., 2003). System usage is also an important element in literature on non-adoption or resistance of users. However, in comparison to the aforementioned stream, there is no consensus on the maturity of our understanding of IS resistance in users (Ali et al., 2016, Laumer et al., 2009, Van Offenbeek et al., 2013). Laumer et

al. (2009) developed the Technology Resistance Model (TRM) as an inverse construct of the Technology Acceptance Model (TAM) for investigating user resistance. They conclude that acceptance and resistance are not just asymmetrical counterparts, but need to be understood as separate concepts. Their findings are in line with results from other research (Klaus et al., 2010, Nah et al., 2004, Van Offenbeek et al., 2013). It is not necessarily a contradiction that other researchers still emphasize that both, acceptance and resistance, share a common theoretical basis (Joshi, 2005, Kim and Kankanhalli, 2009). Over the recent years, most researchers have adopted a neutral stance with regard to classifying resistance as functional or dysfunctional (Rivard and Lapointe, 2012, Van Offenbeek et al., 2013). They argue that on the one hand resistance can be productive, if it prevents a faulty IS from being brought into operation. On the other hand, resistance can be seen as a barrier, if it leads to conflicts that waste or divert staff time and hinders the adoption of IS.

A number of theoretical constructs have been applied to explain why resistance occurs (Lapointe and Rivard, 2005, Wen et al., 2011). Markus (1983) argues that loss and gain of power of individuals or groups are the main drivers behind resistance. While one entity would gain power through the implementation of new IS, the other would experience a loss, hence triggering resistant behaviour. Joshi (1991) draws on equity theory and reasons that users perceive the implementation of a new IS as change. According to this theory, users evaluate that change in terms of comparing their equity status before and after implementation and outcomes relative to organization and reference groups. If the users perceive the result of the comparison as unfavourable, they are likely to resist. Marakas and Hornik (1996) focus on the changes to work modes and routines brought about by an IS implementation. They conclude that users who experience stress and fear induced by these changes are likely to show resistance. From a psychological contract perspective, this power shift violates the psychological contract between the organisation that introduces the IS and the users (Klaus and Blanton, 2010). An attributional perspective of achievement motivation is taken by Martinko et al. (1996). Their model suggests that the implementation of a new IS, in combination with experiences related to IS and other factors, generates causal attributions. According to this model resistance occurs, if users expect, driven by these attributions, future outcomes and performance to decrease. Another explanation for why users decide to resist is the theory of status quo bias (Kim and Kankanhalli, 2009, Samuelson and Zeckhauser, 1988). Kim and Kankanhalli (2009) point out the important role of switching costs that bias users to prefer a current situation and so lead to resist against a new IS implementation.

All above mentioned theories apply a single level of analysis, so they conceptualize resistance either on the individual or on the group level. That approach introduces a levels bias that multilevel models seek to overcome (Burton-Jones and Gallivan, 2007). In their multilevel model, Lapointe and Rivard (2005) cluster the extant theoretical models around five basic elements: subject, object, behaviours of resistance, initial conditions and perceived threats. They also propose a longitudinal perspective on resistance and suggest that IS implementations can be viewed as a sequence of episodes. At the beginning of each episode, certain conditions are in place. Users then assess, if threats follow from the interaction between these conditions and the object of resistance. For instance, at the beginning of an implementation of an Enterprise Resource Planning (ERP) system, one of the initial conditions may be the established work routines in quality assurance, whereas the features of the ERP system are the object of resistance. If users then expect threatening consequences, such as job loss, because the ERP system is capable of automating these routines, resistance behaviours are likely to follow. It is important to note that, as the implementation proceeds, initial conditions and object of resistance can be modified. While in the early stages, the initial conditions are manifest on the individual or on the organizational level, triggers may activate additional conditions on the group level and also modify the existing ones. Triggers can be actual consequences, events or reactions, such as incentives offered by management to employees who volunteer to take over the role of a key user in an ERP system implementation. Consequently, the object of resistance may also change from the system features to system significance or advocates as the implementation emerges. For instance, finally in an ERP system implementation, quality assurance staff, as a group, might be aggressive against members of the IT department, who are perceived as advocates of the new system. Concerning the emergence of group re-

sistance behaviour, Lapointe and Rivard (2005) differentiate between a process of compilation and a process of composition. They suggest that in an early stage behaviours of individual users are independent, so group resistance behaviour is compiled from these individual behaviours. In later stages, the individual behaviours converge, leading to a composition of group resistance behaviour.

Beyond explaining resistance behaviour of groups in general, few researchers have developed typologies of specific user groups. Klaus et al. (2010) identified eight different groups. The behaviours of these groups range from non-resisting, impatient and complaining to aggressive forms of resistance. Lapointe and Beaudry (2014) and Van Offenbeek et al. (2013) both integrate acceptance and resistance research in their typologies. However, their conceptualisations of acceptance and resistance differ significantly. While Van Offenbeek et al. (2013) interpret these as poles of two independent factors, Lapointe and Beaudry (2014) see them as a mindset. For Van Offenbeek et al. (2013), the factors represent continua from support to resistance and from acceptance to non-acceptance respectively. The four archetypes defined are supporting user, resisting user, supporting non-user and resisting non-user. For Lapointe and Beaudry (2014), the mindset is one dimension, while compliance with IT usage policies is the second one. Their proposed typology consists of five archetypical behaviours, which are engaged, resigned, dissident, deviant and ambivalent.

A number of these types are counterintuitive, such as the resisting user, as they seem to combine mutually exclusive characteristics. However, these types can be at least partially explained by considering the roles of mandatoriness and voluntariness in a given implementation of an IT system (Brown et al., 2002, Chae and Poole, 2005, Wu and Lederer, 2009). For instance, a company is likely to enforce usage of newly implemented ERP systems, whereas it might leave it to the discretion of the employees to use software for informal purposes. Therefore, it seems reasonable to expect that resisting usage would occur rather in the case of the ERP system, as opting out would not be an option. However, mandatoriness and voluntariness need to be understood as a continuum to avoid oversimplification (Brown et al., 2002, Chae and Poole, 2005).

Healthcare (the industry sector in which we undertook the study) has seen many attempts to introduce IS with some successes but also high profile failures particularly around systems focused on patient care. Reviews of IS implementation in healthcare highlight the complex nature of an IS implementation in this sector; how it cannot be viewed as a simple rollout but is a complex, dynamic organisational change process requiring a balance between top-down and bottom-up approaches (Berg, 2001, Greenhalgh et al., 2004). Furthermore the importance of reflective, ongoing and multi-dimensional evaluation has been emphasised when introducing IS into healthcare (Sligo et al., 2017). Typically such accounts, however, do not provide insight into why individuals on the one hand support an IS, e.g., by promoting its implementation among colleagues, while on the other hand refrain from using it. This is the paradox we observed during the aforementioned pilot implementation in the healthcare field and we aim to explain in the remainder of this paper.

3 Methodology

3.1 Context description

We conducted the study between February and July 2016 with healthcare teams and networks working within a national health service. The participants were taking part in a pilot of collaborative tools designed to support their cross-organisational and team working and informal learning. In total, 44 healthcare professionals, holding management or administrative roles, took part in the pilot. Their groups were existing networks or teams, who regularly met to work on joint projects (e.g., to develop a new shared service across the cross-organisational network or to develop a new training programme), but their work in these groups was only part of their full job roles. Their work was strategic or project-based, was not directly focused on patient care and the IS tools and systems did not include patient information.

The collaborative tools that the participants were piloting had been co-designed with healthcare professionals, from similar groups, to support collaborative working and learning in these contexts (Santos et al., 2014, Tomberg et al., 2013). In particular the tools had been co-designed to provide support in areas that healthcare professionals had identified as being problematic for them when working in these distributed groups. The tools were designed to enable the healthcare professionals to keep work flowing and focused in between group meetings, by providing an online collaboration space where the project background, ideas, issues and solutions can be recorded and discussed, by a lightweight structuring to this process to help the group keep moving their work towards a solution and by online collaborative writing support so that the group can then further develop this into a formal written report.

The groups, who voluntarily joined the pilots, were provided with support to use the tools as part of their normal group work over a period of approximately five months. This involved an initial training workshop which introduced the tools, provided hands-on training and at which the group decided upon the project(s) for which they would use the tools. After the training session both online support (video FAQs, email support, regular email hints and tips sent out) and more individual support (telephone support and regular phone calls with key contacts in the groups) were provided. An interim workshop was run half-way through the pilot at which further hands-on support was provided and the use of the tools was discussed with participants. Whilst the participants were mainly positive about the potential of the tools in their feedback during the pilot, the analysis of the log data showed that their actual usage of the tools was very low - mainly limited to interactions just prior to or during the training and support workshops. So in the final workshop we wanted to explore the reasons for this low usage (resistance to the tools) in more detail, and in particular to use a systematic approach to identify whether there were groups of users who were resistant for different reasons. Therefore the final workshop gathered feedback and usage examples through a focus group and interviews, but also used a Q sort activity to find out more about the participants' attitudes to the piloted tools and IT more generally.

3.2 Q Study

Researchers have repeatedly demanded a greater use of theoretical and methodological variety in IS adoption and diffusion research (Choudrie and Dwivedi, 2005, Williams et al., 2009). Though Q methodology has been applied by some IS researchers (e.g., Klaus et al., 2010, Tractinsky and Jarvenpaa, 1995, Vizcaíno et al., 2013), the number of published studies is rather limited. Q methodology is considered to be a robust approach that "combines the strengths of both quantitative and qualitative methods" (Brown, 1996). It allows an in depth investigation of different viewpoints and its results are fully replicable (Sell and Brown, 1984). Instead of estimating population trends, Q methodology focuses on identifying the diversity of views expressed and exploring subjectivity (Cross, 2005). In the context of IS research, its ability to gain deep insights into user and group attitudes is well documented (Klaus et al., 2010, Thomas and Watson, 2002). For studying attitudes and subjective opinion within the health field it is highly recommended (Cross, 2005). To answer our research question, we needed to explore attitudes of users in a healthcare setting in an unobtrusive way. Given the line of arguments above, we identified Q methodology as the suitable methodological approach for our research problem.

Q methodology dates back to the 1930s (Stephenson, 1935) and combines quantitative and qualitative approaches for the systematic study of subjectivity in such a way that it helps to identify simple structures from complex data whilst remaining mindful of personal interpretation (Baker et al., 2006, Brown, 1993). While applying Q methodology, the researcher is expected to collect a representative spectrum of opinions related to a specific research question. To achieve that the researcher identifies a number of stimuli, usually verbal statements, that represent the Q set or Q sample. During the data collection process, the participants are expected to sort all statements in a Q sort, so that the items are interdependent. In this way, the researcher can capture the point of view of each individual. Once the participants have completed the Q sort, by sorting all statements provided, the researcher can calculate

the intercorrelation of all Q sorts by a factor analysis. Each resulting factor represents a viewpoint shared between individuals. Q methodology is usually applied to small sample sizes, since it focuses on viewpoints and subjectivity rather than generalizability (Brown, 1980).

In order to acquire a holistic understanding of the professionals' viewpoints, we decided to develop two Q sorts, as user perceptions may vary between IT in general and a specific information system under study (Laumer et al., 2009). Consequently, our focus was not only to identify the attitude of the users towards the piloted collaborative tools, but also extend our findings by investigating additionally their general attitude towards IT support for collaboration. We based our two Q sets on qualitative data, which were gathered during the overall study and literature (Klaus and Blanton, 2010, Hoehle and Venkatesh, 2015), following the design process proposed by McKeown and Thomas (1988) and Watts (2012). This process resulted in 122 statements. Subsequently, by looking at each statement in detail we grouped them into categories; namely "barriers", "communication", "connectivity", "creativity", "ease of use", "enjoyment", "face-to-face", "need for tool", "responsiveness", "sharing" etc. While iterating through the statements, we aimed to retain those statements that were most representative from each category and at the same time assign them to the corresponding Q sort. Thus, statements that had a better fit to general attitude towards IT were assigned to the first Q sort, while statements that had a focus on the attitude towards the piloted collaborative tools were assigned to the second Q sort. Each of the resulting Q sets included 25 statements. In table 1, the first Q set is represented by statement numbers 1 to 25 and the second one by numbers 26 to 50.

The Q sorts were conducted both in a paper-based setting and online, since not all invited participants were able to join the face to face workshops that were organised and in which the Q sorts were embedded. In the paper-based setting, each participant received a piece of paper that illustrated a forced-choice distribution as shown in figure 1 and cards printed with the statements. Firstly, a facilitator introduced the participants to the concept of the Q methodology and explained the goal and procedure of this approach. Afterwards, the participants were asked to read thoroughly the statements on the cards and create three piles that represented three categories; one category for statements that matched their experiences, one category for those statements that did not match their experiences and one category for statements that they were ambivalent about. As soon as the participants had completed the first categorization, they were instructed to place the statements in the forced-choice distribution paper they had in front of them. The forced-choice distribution was used to ensure an efficient sorting process (Brown, 1980, Watts, 2012). After sorting the statements, the participants could reconsider their choices and rearrange the statements if they changed their minds. As soon as the participants finalized the sorting of the first Q sort (statements 1-25) they had to repeat the same procedure for the second (statements 26-50).

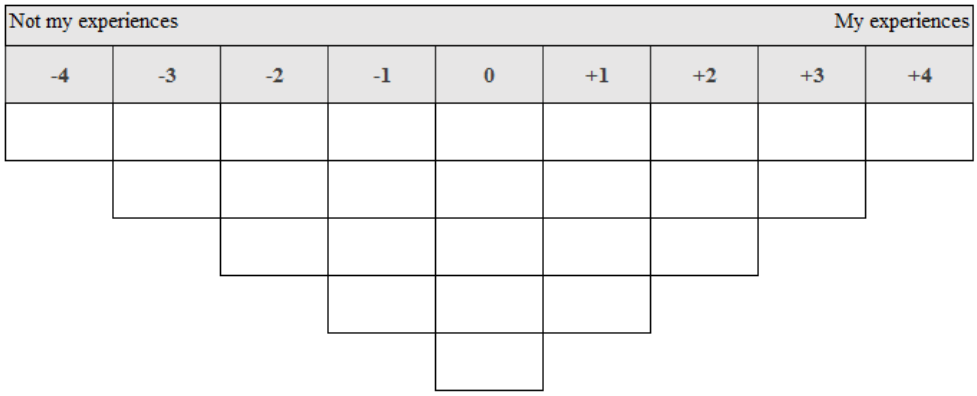

Figure 1. Forced-choice distribution

In setting up the online Q sorts we used a combination of the software packages FlashQ (Hackert, 2007) and HTMQ (approxima, 2015). As far as possible, the online procedure resembled its offline counterpart. To obtain feedback on content, structure and instructions of the online version we con-

ducted a pilot test with three healthcare professionals. Their feedback allowed us to make important adjustments, mainly related to the content of the instructions. Both, online and paper-based, versions concluded with the collection of demographic information.

In total 44 participants took part in one of the pilot groups, of which 13 attended the final workshop and completed the paper-based Q sorts. The other pilot participants received an email with a link to the online version. Six participants completed the online Q sorts, which results in an overall response rate of 43%. The healthcare professionals were between 20 and 60 years old, with an average of 44 years and 90% of them were female. All participants stated they use email, 83% use social media and instant messengers and 47% use video-conferencing.

After the collection of our raw data, we chose the software package PQMethod (Schmolck, 2014) for analysis. Due to a mistake in data recording two datasets had to be dropped. The two Q sorts from the remaining 17 participants were combined and analysed as a whole, as initial separate analysis of both Q sorts revealed an identical association between factors and participants. The combined Q sorts were intercorrelated and analysed by a factor analysis based on the resulting intercorrelation matrix. Here it is of utmost importance to note that in Q methodology the factor analysis is performed by-Q sort (McKeown and Thomas, 1988), which means it is targeted to identify similarities between participants as a whole. We retained three factors that had eigenvalues greater than 1.00, which is an accepted criterion for retaining a factor, though shouldn't be seen as the absolute cut-off value (Brown, 1980, McKeown and Thomas, 1988, Thomas and Watson, 2002). Furthermore, all three factors fulfilled Humphrey's rule and the cross-product of each factor's two highest loadings exceeded twice the standard error (Brown, 1980). We confirmed these results to be independent from applying Principal Component or Centroid factor analysis method. The three factors were rotated using Varimax rotation in order to maximise the explained variance (Watts, 2012).

During the factor analytical process we determined which Q sorts load significantly on which factor. Hence, Q sorts loading on the same factor show a very similar sorting pattern, in other words, the participants who contributed that Q sorts share a viewpoint. For each factor, its significantly loading Q sorts were merged into one ideal typical Q sort, called factor array. As for the merging the height of each loading must be considered, factor arrays include for each statement a normalised score in addition to the rank (see table 1).

In order to interpret the factor, the whole configuration of the statements, represented by a factor array, needs to be understood by the researcher (Watts, 2012). We started our interpretation by identifying the highest and lowest ranked statements for each factor. Then we analysed which statements were sorted higher or lower in comparison to the other factors in order to capture an initial idea of the viewpoint. Applying abductive logic, we then iterated between the remaining statements and our interpretation to achieve a holistic understanding of each factor.

4 Results

The results section is structured as follows: First, table 1 shows statements, factor arrays and normalised scores for each of the three factors identified by the Q factor analysis. By providing this information, we enable the reader to replicate and reinterpret our findings, which is considered good practice in applying Q methodology (Brown, 1980, Thomas and Watson, 2002). Then we provide a textual interpretation of the three factors, headlined by a label. In the textual description, the identifying number of the statements we base our interpretation on is indicated in parentheses.

		Factor					
		1		2		3	
No.	Statement	Norm. score	Rank	Norm. score	Rank	Norm. score	Rank
1	IT increases my workload.	-0.82	39	-1.02	42	-0.34	31

No.	Statement	Factor					
		1		2		3	
		Norm. score	Rank	Norm. score	Rank	Norm. score	Rank
2	I find IT quick and easy to access.	1.05	10	0.89	11	-1.43	45
3	The amount of messages I receive makes it difficult to be productive in my work.	-0.50	36	0.63	15	0.96	10
4	I reply immediately if I receive a simple question in an email.	1.40	3	1.48	5	1.35	6
5	I find it easy to search online for information/ resources for my work.	1.25	8	0.41	20	0.93	11
6	I feel a pressure to be available 24/7.	-0.46	34	0.38	21	-0.96	40
7	Professional and private topics are blurred in my communication.	-0.94	41	-0.21	28	-1.98	50
8	My internet connection at work is reliable.	-0.30	32	-0.52	34	0.08	23
9	I use email to plan and document tasks and meetings.	-0.04	28	1.37	6	-0.07	27
10	I find it easy to share digital content with colleagues.	1.28	7	-0.15	26	-0.57	36
11	IT increases the complexity of my tasks.	-1.67	47	-2.02	49	-0.48	34
12	High IT security standards make it hard to connect to others.	-1.02	42	-1.17	44	0.31	21
13	For me, it feels almost the same to communicate with a person face to face or virtually.	-0.04	29	-0.34	32	-0.39	32
14	I feel IT supports me best when it complements face-to-face meetings.	0.26	23	-0.84	40	0.57	16
15	I am sceptical about using new technology.	-1.74	48	-0.78	39	-1.47	47
16	I don't have enough time to make the best use of the IT tools available to me.	-0.49	35	0.48	19	1.72	2
17	I enjoy trying out new IT.	1.57	1	1.05	9	-0.01	24
18	In stressful periods, I use several communication channels in parallel to get hold of people.	-0.01	26	1.32	7	-0.10	28
19	It is easy to misinterpret emails and messages.	0.54	16	0.51	17	0.56	17
20	As soon as I receive a message, I need to check it.	0.74	14	-0.40	33	-0.02	25
21	Technology is taking over everything at the moment, I feel pushed to use it.	-1.59	46	-0.65	37	-0.74	38
22	I find the more I use technology the simpler it gets.	1.33	5	0.09	23	0.45	18
23	People expect that I respond to emails as fast as possible.	0.47	18	0.58	16	1.00	9
24	The use of email to cascade knowledge is not efficient.	0.26	24	-1.10	43	-0.12	29
25	When I have a lot of work, I tend to communicate less.	-0.53	37	-0.00	24	0.74	13
26	The tools give me an overview of the project without having to trawl through emails.	1.37	4	-1.18	45	0.57	16
27	The tools are yet another system I have to look at.	-1.18	44	1.52	4	0.09	22
28	The tools help me to be creative.	-0.03	27	-0.23	30	-1.13	43
29	I would use the tools more often, if my colleagues were more active in their use.	1.47	2	1.53	3	0.35	20
30	The tools add another layer of complexity to what we already do.	-1.14	43	1.93	1	0.88	12
31	I have doubts that the tools are secure.	-2.18	50	-1.59	48	-0.49	35
32	I find the tools quick and easy to access.	1.32	6	0.75	13	-1.35	44
33	I enjoy trying out new technology tools.	1.16	9	1.19	8	-0.97	41
34	I like that the information in the tools is live and up to date.	0.43	19	0.67	14	0.37	19
35	The tools allow me to give the right information to the right group of people at the right time.	0.27	22	-0.99	41	1.14	8
36	I only share my work with others, when it is ready.	-0.39	33	-0.14	25	-1.67	49
37	I don't have enough time to use the tools.	-0.91	40	1.62	2	1.62	4
38	The tools allow us to put our heads together without actually having to	0.56	15	0.76	12	1.36	5

No.	Statement	Factor					
		1		2		3	
		Norm. score	Rank	Norm. score	Rank	Norm. score	Rank
	meet up.						
39	The tools require more IT skills than I have.	-1.93	49	-2.19	50	-0.99	42
40	I find it useful to use the tools within a face to face meeting.	0.29	21	-0.19	27	-0.75	39
41	The tools offer functionalities that help us improve our practices.	-0.21	30	-0.64	36	-1.66	48
42	The tools allow me to contribute in my own timeframe.	0.52	17	0.12	22	-0.04	26
43	The tools allow me to learn from others.	0.94	11	-0.22	29	0.61	14
44	The tools help me to avoid dumping lots of information on others by email.	0.13	25	-0.74	38	-0.13	30
45	The tools allow easier control of collaboratively developed content.	0.79	13	-1.28	46	1.14	7
46	The work we intended to use the tools for is not high priority work for me.	-0.73	38	0.97	10	-0.41	33
47	The tools help me to gain a better understanding of my colleagues' ideas and perspectives.	0.85	12	-0.54	35	1.92	1
48	I find it useful to use the tools for my individual work.	-0.25	31	-1.29	47	-1.44	46
49	The tools help make decision making visible.	0.30	20	-0.32	31	1.67	3
50	The projects I am working on do not require the level of support offered by the tools.	-1.45	45	0.48	18	-0.70	37

Table 1. Statements, factor arrays and normalised scores

The convinced connector, waiting for collaborators. Factor 1 has an eigenvalue of 5.03 and explains 30% of the study variance. Five participants are significantly associated with this factor.

Participants of this factor enjoy using IT and trying out new tools (17, 33). They regard IT as an enabler to complete their tasks and not as a driver for increased complexity or workload (11, 1, 30). Being in line with that, they do not perceive virtual meetings as greatly different from face-to-face meetings. They also use IT as support in their face-to-face meetings which shows that IT is completely integrated into their work processes (13, 14). This attitude affects the way they use the tools for their projects as they use them during their face-to-face meetings, but also see them as a chance to discuss and develop ideas without meeting up in person (38, 40). People of this group are typically highly connected and often check their phone immediately as soon as a new message arrives, which however they believe does not affect their productivity at work (3, 20). In stressful periods, they often use several communication media in parallel to comply with their commitments (18) and will not disconnect or communicate less if they have a lot of work to do (25). Despite this multi-communication, it seems that they still manage to separate professional and private topics (7) and report that they do not feel high external pressure to be available all the time (6). Although time is a scarce resource for them, they try to make time to familiarize themselves with new IT tools (16, 37, 46). As a consequence, handling different IT systems in parallel is not a big burden for them (27). They see themselves as skilled and confident IT users (39, 2, 22, 32) and do not worry much about possible threats such as compromised IT security or do not experience these threats as limiting (12, 15, 31, 21). They consider a possible misinterpretation of emails and messages to only pose a slight risk in an online conversation (19).

People of this group don't regard email as the adequate medium for tasks such as planning, documenting, searching for information as well as knowledge sharing (44, 9). However, they feel at ease with using IT in general for searching information and for knowledge sharing (5, 10, 24). This group sees the highest value of the collaborative tools in the ability to serve as central information hub (26, 35) that contains up to date content (34). That includes storing and accessing information independent of email, learning from others, understanding others' ideas and perspectives plus supporting the creation process of shared content and decision making (43, 47, 45, 28, 49). Although they like the tools for collaborative tasks and knowledge exchange, as the tools offer the required functionalities and support (50), they do not regard them as very useful for their individual work (48).

Despite their general positive stance towards the collaborative tools, they see the benefit from the tools depending on a critical mass of colleagues actively using the tools (29).

The savvy explorer, sceptical about the tools' benefits. Factor 2 has an eigenvalue of 2.33 and explains 14% of the study variance. Four participants are significantly associated with this factor.

Similarly to factor 1, participants of this factor do not perceive IT in general as a driver for increased complexity (11) or higher workload (1). The people categorized into this group seem to be confident about their IT skills (17, 2, 22) and regard themselves as tech-savvy (39). However, it does not seem that they live in this virtual world and use IT as naturally in their daily lives as the people of factor 1 do.

Although they do not embrace this virtual world, they do like to try out new technology (33) and are more open towards new IT than people in the other two groups (15). Furthermore, they are not too concerned about the misinterpretation of email and messages (19) like the other groups are, nor do they think that high IT security standards make it difficult to connect to other people who are often scattered around the world (12). In comparison to the other groups, the people in this group tend to allow the blurring between work-and social-related topics (7) however, it seems that they can resist the urge to check their phones as soon as a new message arrives much better than the other two groups (20). Despite their positive attitude towards IT in general, they are sceptical towards some uses of IT to support collaboration in their daily work processes. For example, they do they not regard virtual meetings to be a substitute for face-to-face meetings (13) and they are cautious with sharing their work and don't distribute it before it is in a good shape, in contrast to the other two groups (36).

Their ambivalent attitude towards IT is also reflected in their opinion on the collaborative tools. On the one hand, they think that the tools help them to be creative depending on the task at hand (28), they like the easy handling of the tools (32) and the tools allow them to meet and collaborate virtually (38). They further appreciate, even more than the other groups, that the information accessed through the tools is always live and up-to-date (34). On the other hand, it seems that the people in this group perceive the tools as adding complexity and see them as "just another system" (30, 27), while potential benefits such as an improved overview or easier control of collaboratively developed content are widely disregarded (26, 35, 45, 47). In comparison to the other groups, participants of this group think that it depends on the situation whether they can learn from other people (43). They do not think that the tools make the decision making process more visible and comprehensible (49) nor do they regard them as useful to complete their individual tasks (48).

For this group, email works properly for planning, documenting, and knowledge sharing purposes (9, 24). Consequently, they don't really value the collaborative tool functionalities which aim to replace email for these purposes (44). This group seems quite reluctant to use the new tools for their daily work processes and see the lack of time as one of the main reasons to avoid them (37). The members of this group are often already stressed by an intense communication flow (6, 3, 4, 23, 18) and therefore are unlikely to make time to familiarize themselves with the tools. Additionally, they think that the tools do not really fit their working style and the tasks at hand (46, 50, 41) which explains the fact that the collaborative tools are not widely used among colleagues. This ends up in a dismissive group dynamic and further reinforces the non-usage of this group (29).

The ambivalent follower, overwhelmed by complexity. Factor 3 has an eigenvalue of 1.65 and explains 10% of the study variance. Four participants are significantly associated with this factor.

In contrast to factors 1 and 2, participants of this group seem to be considerably less tech-savvy. They are less confident about their own IT skills and do not enjoy trying out new IT tools (39, 17, 32, 2). Although they use IT in their daily work and private lives, it seems that this usage is more externally than internally driven. For people of this group it seems to be difficult to be productive at work due to the often vast amount of incoming messages (3). Hereby, they take good care to separate between work-related and other topics in their conversations (7). Although, it seems that they respond slower to easy questions and requests in emails than the other groups (4) and do not really feel the internal urge to respond to messages as soon as they arrive (20), they actually perceive more external pressure than

the other groups to respond to emails as fast as possible (23). There are several indicators which show that the members of this group are reluctant to integrate IT in their daily (work) life. In contrast to the first group in particular, they still see a big difference in meeting face-to-face and virtually (13), they do not think the tools are useful in face-to-face meetings (40), and they only use email to plan and document tasks or meetings and to cascade knowledge in some cases (24, 9). Although they do not think that IT increases their workload and complexity (1, 11), their ranking of these statements indicates that they are more likely to blame IT than the other two groups. In terms of security, we can observe a similar picture. They feel that the tools are secure and they do not think that high IT security standards makes it more difficult to connect to others (31, 12), nevertheless, again their statement ranking indicates that they do not trust IT as much as the other groups do. Their general attitude towards IT is also reflected in their opinion and their usage of the collaborative tools. Similar to factor two, people of this group hold ambivalent opinions about the tools. On the one hand, they think that the tools help them to better understand their colleagues' ideas and perspectives (47), they appreciate the possibility to learn from their colleagues with the help of the tools (43) and the chance to get an overview of the current status of the project without scanning all their emails (26). They value some of the benefits of the tools even more than the other factors such as increasing the transparency of the decision making process (49), to be able to develop ideas without actually meeting up (38), the ability to provide the right information to the right person at the right time (35) and the ability to monitor collaboratively developed content (45) On the other hand, they still struggle with how to integrate and use the tools in their daily work (41), do not find the tools very useful to complete their individual work (48) and do not appreciate the timeliness of the information provided by the tools as much as the other groups do (34). Therefore, they perceive the tools as eventually adding complexity to their tasks (30, 27) and think that they can restrict them in completing their tasks in their own speed (42). Lack of time limits both their capability to leverage IT tools in general (16) and the collaborative tools in particular (37). They perceive low activity of others as a limitation for their own tool usage to a lesser extent than the other two groups (29), though they tend to openly share their work even when it is not ready (36).

5 Discussion

Our study was took place in healthcare focussing on a set of collaborative tools. Though the tools had been co-designed and developed, tailored to the specific needs of the prospective users and received consistently positive user feedback, usage remained on a low level throughout the pilot. We set out to explain this paradox of supportive non-use. As our main contribution, we identified three different viewpoints shared between groups of users that help to unravel this paradox. The first group, the convinced connectors who wait for collaborators, is positive about the tools, but limits its usage because the tools are not widely adopted by co-workers yet. The second group, the savvy explorers who are sceptical about the benefits of these tools, seeks to simplify work and communication processes. They are positive about the general idea behind the tools, but critical about the realisation. Combined with the fact that the tools are not a replacement for other IT, users of this group share the viewpoint that the tools eventually contribute to an increased complexity rather than simplification. Already struggling with the integration of IT into their work life, the third group, the ambivalent followers who are overwhelmed by complexity, approves the benefits of using the tools in theory, but fails to leverage these in practice.

In their framework, Van Offenbeek et al. (2013) define the resistance dimension as a continuum ranging from aggressive and passive resistance through neutrality to constructive cooperation and enthusiastic support. On the other dimension, low use is anchored between the neutral point of acceptance and non-use as a form of non-acceptance. Hence, in that model, all three of our user groups would be regarded as one of the two non-user types. Given the finding that groups one and three both rank a considerable number of statements in a way that expresses unconstrained (group one) or ambivalent (group three) appreciation of the collaborative tools, we argue that these groups represent two appear-

ances of the supporting non-user type. Our second group rated the collaborative tools less favourably. However, as passive resistance is understood as behaviour intended to slow down a system implementation (Meissonier and Houzé, 2010), we do not attribute this group to the resisting non-user type.

As we demonstrate with our results, the absence of clear resistant behaviours does not guarantee acceptance in a sense of high system use. Van Offenbeek et al. (2013) argue that the implementation setting, mandatory vs. voluntary, can act as the fulcrum that determines whether or not resistant behaviours occur. However, as already noted, mandatoriness and voluntariness are not mutually exclusive conditions (Brown et al., 2002, Chae and Poole, 2005). Though our participants volunteered to take part in the pilot and were free to leave without giving any reason, we observed during our workshops that they felt obliged to contribute to a successful implementation. They expressed guilt that their lack of engagement might negatively affect their collaborators' decisions to adopt and sustain the tools which might entail reduced benefits from the system for others and themselves. This observation reinforces the role of social influence in an implementation (Leonardi and Barley, 2010).

Our participants were recruited from different healthcare teams and networks within a national health service. None of the pilot groups enforced tool use through their guidelines. Therefore, in an attempt to position our user groups in the model of Lapointe and Beaudry (2014), we deem that all user groups comply with the IT usage policies of their employers. The compliant categories defined in the model are engaged, resigned and ambivalent. As engaged is coupled with acceptance in terms of use and resigned with a behavioural manifestation of resistance, we conclude that all three of our user groups represent appearances of the ambivalent category.

Prior research has already acknowledged that typologies of user groups need to address dimensions, such as acceptance and support, as continua (Lapointe and Beaudry, 2014, Van Offenbeek et al., 2013). As a further contribution, we gained a more detailed understanding of IT resistance types by identifying groups along these continua that significantly differ from each other according to the reasons for non-usage and the perceived potential benefits of IT. We argue that such an enhanced understanding of user groups is necessary to increase the explanatory power of theoretical constructs that explain why resistance occurs (e.g., Kim and Kankanhalli, 2009, Marakas and Hornik, 1996, Markus, 1983). We further suggest that, though behaviours of individuals are independent during an early phase of an implementation (Lapointe and Rivard, 2005), it is possible to already cluster these into groups that share similar viewpoints. It was shown that the success of an IS implementation also depends, in the long run, on decisions taken alongside the implementation path (Lapointe and Rivard, 2005). However, knowing the involved user groups and their viewpoints is a prerequisite for that decision making. Therefore, it is beneficial to have that knowledge already in an early phase.

From a managerial perspective, being aware of different groups of users is essential in an implementation project. Thus, identifying and dealing with supportive non-use is challenging, because common sense might easily lead to the assumption that an individual with a supportive attitude will naturally adopt a system. As a consequence, there is a danger of overlooking this resistance type when mitigation strategies are defined in a project. However, strategies to deal with non-user or resistant groups need to be in place for all types, as wide acceptance of a newly implemented system is a prerequisite for realising project goals, such as an increased productivity (Klaus et al., 2010). For instance, it seems reasonable to expect that the needs of group three could be addressed by extra training and coaching sessions to help them master the complexity of the tools. This group shares a certain uneasiness with IT in general and the collaborative tools provided in the case in particular, so by overcoming those barriers these users could turn into actual supporters. As soon as this group starts using the tools, the convinced connectors will find a sufficient number of collaborators so that managers can recruit champions from the convinced connectors who drive the process further. The entailed positive network effects will make added benefits evident for group two, so that their scepticism is reduced. However, group two is also opinionated about its disapproval of the usefulness of the tools. A clear implementation plan that also addresses complexity reduction of the overall system landscape might be nec-

essary to further convince these users of the tools' benefits. Such changes would remove the key barriers of all three groups, creating the potential to turn non-users into users.

6 Conclusion

This paper enhances the understanding of non-users based on a Q study. We investigated a pilot roll-out of collaborative IS in healthcare and found three different user groups. While in all three groups the actual use of the tools was low, their subjective reasons behind non-use differ significantly. We provide a detailed explanation of these reasons, explain the paradox of supportive non-use, discuss our findings in the light of extant literature and suggest theoretical and managerial implications.

The healthcare sector is currently working under extreme pressure (increasing demands, financial constraints, skills shortages, innovations in treatment and practice). This, combined with the fact that this was a pilot, might contribute to low usage; since healthcare professionals would not be prioritising interacting with the system. However, the Q methodology allowed us to dig deeper into the reasons given by individuals, enabling us to see that that there were distinctly different reasons and motivations for the low usage given by subgroups of our participants. Such an understanding can help when planning the next steps in an iterative, agile IS development and implementation project.

Like all exploratory studies, ours has limitations. While 43% of all individuals involved in the pilot took part in our study, the demographics reflect age and gender distribution of the involved national health service's employee base. Obviously, we were not able to gain any insights about the perceptions of those participants, who neither attended the final workshop, nor completed the Q sorts online. Furthermore, as the tools were tailored to that specific healthcare setting, no further pilots in different industries could be examined. However, as Q method is primarily concerned to establish viewpoints that are present in a given sample, rather than to make claims about the distribution of viewpoints in a wider population (Brown, 1980, Thomas and Watson, 2002), we deem our methodology as appropriate. Hence, we are confident that the factors that emerged from our study can also be found in similar settings.

Future research could explore groups of non-users in different implementation settings. Apart from the industry, especially the context mandatoriness vs. voluntariness should be considered. Furthermore, there are a number of possibilities to extend our study, for instance, by including groups of users that adopted a system or understanding the evolution of these groups from a longitudinal perspective. This could support research and practice in better explaining the dynamics that emerge between different groups, defining mitigation strategies and eventually fostering IS adoption.

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