# Organizational Climate for Innovation Implementation and ICT Appropriation: Exploring the Relationship through Discourse Analysis

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**Abstract.** In this paper we explore the relationship between the organizational climate for innovation and ICT implementation success, defined as the stage in which end-users highly appropriate the newly implemented ICT. This exploration is guided by the question: how are organizational climate for innovation implementation and end-user appropriation of ICT related? We carried out a longitudinal case study in a hospital where new ICT had been implemented. We analyzed the organizational climate for innovation and end-user appropriation by means of discourse analysis. This led to the conclusion the relationship between organizational climate and end-user appropriation needs to be redefined.

## 1 Introduction

Modern marketplace forces organizations to implement innovations [1, 2]. But yet in many cases organizations implement innovations – technological, structural, or cultural – with unsatisfactory results [3, 4]. Information and communication technology (ICT) implementation has been one of the most prominent examples of innovation over the last decade, and will stay one of the most important ones for the coming years.

As such technologies become progressively more intertwined in the operations, products, and infrastructure of companies, it is crucial that implementation or ongoing use of ICT is successful [5]. This remains a challenge. Literature keeps on providing examples of failures of ICT projects. Researchers identify that companies' inability to achieve all intended benefits of ICT mainly roots in the implementation process of such technology, and less in its technical capability [6, 7, 8, 9, 10, 11, 12].

The question is how to 'organize' successful innovations, and more specifically information and communication technology implementations. A number of researchers has started to acknowledge that the organizational climate may play a decisive role in whether innovations will be successful or not [13, 14]. [15] for example acknowledges that the organizational climate should be stimulative towards innovations in order to assure successful implementations.

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The structure of the paper is as follows. First we elaborate on the key concepts. We focus on the appropriation concept at a user-level and on organizational climate for ICT implementation at an organizational level. After this, the research method is explained and the results is presented. In a final section we will draw a number of main conclusions and reflect on the research method used.

## 2 ICT Implementation

We view ICT implementation from the perspective of innovation implementation. The focus is on the implementation of technology that an organization is using for the first time, regardless of whether other organizations have previously used the same system [16].

In lots of IT studies implementation is assumed as an implicitly clear word [17, 18, 19, 20, 21, 22]. However, searching for precise understanding of ICT implementation we found a variety of its meanings [5].

We approach our definition of ICT implementation from three angles: the period of time, the core processes involved in implementation, and the indicators of the implementation completion. Implementation of any kind of innovation in a broad sense concerns a period from the initiative to get this innovation till its active use. Usually it takes a long time before the initial idea becomes a reality in day-to-day practice. To specify our research interest we limit such time and consider implementation of ICT within the transition period only from the technical installation skipping the design stage.

We propose to root implementation completion of ICT in the stage when the end-users 1) make a high number of appropriation moves (or really fully use the technology), 2) appropriate the new ICT in a faithful way, 3) when end-users' attitudes are positive and 4) when there is a consensus among end-users about how to appropriate the technology.

Routine use of technology is limited by the nature of the job tasks: if the task is changed it may have the consequence that use of technology will be different (Bondarouk and Sikkel, 2001). Therefore the full definition of implementation of ICT is as the situated use of a system during the transition period between the technical installation of the system and the appropriate use of it within a certain job task.

## 3 Organizational Climate for Innovation Implementation

Introduction of new ICT requires strong organisational encouragement in order to forward employees efforts in use of the system. The literature on the implementation of innovation describes a lot of organisational practices that accomplish and support innovation use [23] These include training in innovation use, time to experiment, respect from management, financial support, job reassignment, friendliness of an innovation, etc. [24; 25, 26, 27]. [28] posit that all such practices encourage innovation use "through shaping the organisation's climate for implementation" (p. 813).

The organisational climate is widely understood to consist of empirically accessible elements such as behavioural and attitudinal characteristics illustrated by shared perceptions of the employees [29, 30, 25, 31, 15, 13, 14].

We specify the organisational climate for innovative ICT implementation as the employees' shared perceptions of the extent, to which their use of ICT is valued within a company.

Research suggests that the more comprehensively implementation policy and practices are perceived by the targeted employees as encouraging, cultivating, and rewarding their use of a given innovation, the stronger the climate for implementation of that innovation will be [27]. Important is that the climate for ICT implementation can differently result in the same individual within the same organization in one workplace or another, and in one group of employees or another.

[27] suggest to consider particular organisational practices for strengthening climate for innovation implementation as a three-fold construct:

We specify each of three practices for the implementation of ICT as an innovation. An organization has a strong climate for implementation ICT as an innovation if: (a) the targeted users are given autonomy and responsibility in use of ICT and are provided with different learning opportunities (ensuring employees' skills); (b) an intensive collaboration to exchange knowledge and experience about ICT is cultivated among the users (encouraging use of an innovation); (c) the employees are given enough time to learn the system and the management is willing to cooperate and help (removing obstacles to use an innovation).

## 4 End user Appropriation

Innovations are successful if targeted employees faithfully adopt them. However adoption in our view means more than just using or applying an innovation. It means that targeted employees incorporate an idea or tool into day-to-day practice. For new information technology implementation DeSanctis & Poole (1994) introduced the concept of *appropriation*. They developed Adaptive Structuration Theory (AST) with the basic assumption that the effects of technology are not a function of the technology itself, but of the way it is used. Furthermore AST provides promising concepts that acknowledge the non-technical side of advanced information technology in organizations [12].

Two main ideas are based on AST: firstly, advanced information technologies are social in nature. This is expressed by the concept of *spirit of technology*, which is defined as the general intent with regard to values and goals underlying a given set of technical features of a certain ICT [12]. Secondly, advanced information technologies are being 'realized' by its use. This is expressed by the concept of *appropriation*.

AST considers information technology use as a matter of appropriation. In the relatively short history of AST, its developers have gone through some changes in the way they conceptualize appropriation. Initially, AST distinguished three dimensions of appropriation: *faithfulness of appropriation, attitudes towards appropriation,* and *the level of consensus on the appropriation.* However, after rethinking the theory of adaptive structuration, [32] distinguish four dimensions of appropriation: *appropriation moves, faithfulness of appropriation, attitudes towards appropriation,* and *instrumental uses.* So, they added *appropriation moves* and *instrumental uses,* and removed *consensus on appropriation.* We believe that a combination of [32] and [33] provides the most useful concept of appropriation and will therefore be applied in this paper.

## 5 Research Model

To frame our study we start with the premise, depicted in Figure 1, that success of ICT implementation is a function of the relationship between a) appropriation of ICT by the targeted users and b) organizational climate for its implementation. Successful implementation is achieved when the targeted employees appropriate ICT to a high extent. However, we suppose that the organizational climate for innovations and the way ICT is appropriated are interrelated, they mutually shape each other. Even though, we expect a 'fit' between the two concepts in the following way: a 'strong' organizational climate for innovation is related to 'a high level of appropriation, a 'weak' organizational climate for innovations is related to a low level of ' appropriation.

Both concepts are not stable, they may change and develop over time, and thus also during an implementation of an innovation. To illustrate this, in the stage of institutionalized use the organizational climate for innovations may be not very strong. The reasons for this can be multifold, for example - within an organization the management does not introduce a special reward system for experimenting with a new system. Therefore the appropriation of the newly implemented ICT may be quite unfaithful in this specific stage. Management take notice of the low appropriation and start to undertake actions to improve the organizational climate for innovations in order to improve the employees' way of appropriation. In a later stadium the organizational climate may change and become stronger, as may happen to the appropriation of the ICT by employees. In this illustration we cannot and do not want to say something about 'what causes what', but we just take notice of the situation, it specific conditions and actions of actors involved. We consider it as a rich source for learning.

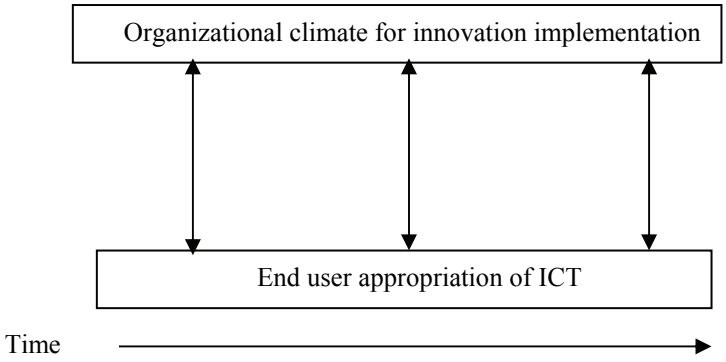


**Fig. 1.** The starting premise.

## 6 Discourse Analysis: A Theoretical Introduction

To explore the relationship between the organizational climate for innovation implementation and end user (or employees' ) appropriation we used discourse analysis. Discourse analysis is a relatively new technique but its use is rapidly growing in the study of human behavior [34]. It is considered as a powerful research strategy [35].

Discourse analysis starts from the assumptions that language is a medium oriented towards action and function, and that people use language intentionally to construct accounts or versions of the social world. Variation in the use of language is the active process of construction in which this is demonstrated. Analyzing discourse needs to pay attention to the concept of variability, as discourse will vary systematically depending on the function it is being used to perform.

We acknowledge but also accept that the way a text or a discourse is analyzed is very subjective and may not be the only valid interpretation. Our analysis may be only one of a number of possibilities. Moreover, by focusing on one alternative, other explanations may even be missed or disregarded. Either way, we believe that social scientific research is never value-free, whether advanced statistical procedures are applied or not. Social sciences in our view need not to 'prove' universal behavioral laws, it needs to provide insights to learn from, to enrich our social worldview. For this purpose discourse analysis is a powerful and adequate approach.

In our study we went to the following procedure to carry out a discourse analysis. A longitudinal case study was conducted in a local hospital in the Netherlands, where a new information technology was introduced four months before our research started. The case study lasted during 6 months. The system implied clerical work for personnel and salary administration. First the system was introduced to three groups from the central salary department and to the personnel secretaries. A detailed data collection was conducted with the first users through semi-structured interviews, observations in the field, and documents analysis.

32 interviews were employed lasting from 45 minutes to 2 hours, in total of 46 hours. Most of the interviews were individual, and also three group interviews were used because of the office environment. Some of the interviews took two meetings, as there was a need in additional clarification and information. We asked employees to describe the organizational climate for innovations and their appropriation of the new system in two stages. Postscripts of all 32 interviews were again discussed with interviewees.

In order to analyze the transcripts we developed a framework that operationalized the constructs organizational climate for innovation and end user appropriation. The results are shown in the tables 1 and 2.

We define organizational climate for innovation as the employees' shared perceptions of the extent to which their use of innovations is valued within a company. In order to use the construct in our study we have operationalized and distinguished: a) *ensuring employees' skills in use of an innovation*, b) *encouraging use of an innovation*, c) *removing obstacles to use an innovation*.

**Table 1.** The operationalization of organizational climate for innovation implementation.

| **Organizational climate for innovation implementation** | | | |
|---|---|---|---|
| **Dimensions &** | **Indicators** | **Range** | **Definitions** |
| 1. Ensuring skills in use of innovation | 1.1 Autonomy and responsibility | From 'high' to 'low' | Delivering authority for decision-making, planning and creativity in use of the system. |
| | 1.2 Promoting different learning opportunities | From 'adequate' to inadequate' | Availability of formal and informal sessions, information and different resources to learn the system. |
| 2. Encouraging use of ICT | 2.1 Feedback | From 'highly encouraging' to 'disappointing' | The level, to which learning and use of the system is given feedback and rewarded. |
| | 2.2. Supporting group collaboration | From 'strong' to 'weak' | Cultivating exchange of experience within a group of users. |
| 3. Removing obstacles | 3.1. Management style | From 'highly supportive' to 'unhelpful' | Perceptions about management as being supportive, caring and willing to help in learning the system. |
| | 3.2. Time | From 'sufficient' to 'insufficient' | Time allowed taking advantages of opportunity to learn the system effectively rather than 'muddle through'. |

Strong climate for innovation implementation is advanced when the targeted employees are provided with:

Is it – to the theoretical section #3 "end user appropriation"? For this section – it must be shortened and made congruent with the 'climate' (see above)!!!!

The concept of appropriation consists of five dimensions: a) *appropriation moves,* b) *faithfulness of appropriation,* c) *attitudes towards appropriation,* d) *consensus on appropriation.* [32] define *appropriation moves* as the ways that users choose to appropriate the available technology structures. They propose four types of appropriation moves: direct use, relate to other features, constrain the use of a feature, and express judgements about a feature. *Faithfulness of appropriation* is defined as the extent to which a certain office technology is appropriated consistent with its spirit. Two indicators are distinguished: use of ICT in accordance with its spirit, and use of ICT with the aim to advance its spirit. By *attitudes towards appropriation* we mean the users' assessments of the extent to which the structures within the system are useful and easy to use. Attitudes set the tone for system usage and can reinforce productive or counterproductive trends in a group's experience with the system [33]. Finally, the fourth aspect we distinguish on appropriation is *consensus towards appropriation*.

The definition we apply is as follows: the extent to which users of office technology agree upon how the technology should be used. In order to achieve effective processes and desired outcomes, it is important that a specific office technology is used in a similar way by all users (indicator 1), and that there are written or tacit rules about how to use the ICT (indicator 2). We believe that a high level of consensus is necessary for all types of ICT use. For example, if in an insurance company, employees who work with a specific ICT do not use it in a similar way, this will probably lead to ineffective work processes. Therefore, whether users of ICT are linked with each other very closely, or they work more as individuals, for the effectiveness of the work processes as a whole, it is important that there is consensus on *how* to use the technology.

The two researchers who wrote this paper separately read all transcripts. They selected all expressions that were informative about the two constructs per stage of the ICT implementation, and placed them into the framework. The result of this activity was a broad set of expressions constructing the worldview of end users per dimension.

The researchers labeled the expressions regarding all indicators of the organizational climate in terms of the proposed range (see table 1): 'high level of autonomy and responsibility' or 'low level of autonomy and responsibility'; 'adequate learning opportunities' or 'poor learning opportunities'; 'highly encouraging feedback' or 'disappointing feedback'; 'strong support for group collaboration' or 'weak support for group collaboration'; 'highly supportive management style' or 'unhelpful management style'; and 'sufficient time' or 'insufficient time'. Then the assumptions/ or propositions/ or conclusions of the climate for innovation implementation was characterized in terms of 'strong', 'weak', or 'neutral'.

The expressions regarding all indicators of end user appropriation were labeled using the proposed range (table 2): 'high level of moves' or 'low level of moves'; 'high level of faithful appropriation' or 'low level of faithful appropriation'; 'positive attitude' or 'negative attitude'; and 'high consensus' or 'low consensus'.

**Table 2.** The operationalization of the end user appropriation concept.

| End user appropriation | | | |
|---|---|---|---|
| Dimensions & Indicators | | Range | Definitions |
| 1.Appropriation moves | 1.1 direct use | From 'high' to 'low' | Openly use and refer to (feature) of the ICT |
| | 1.2 Relate to other feature(s) | From 'high' to 'low' | Substitute, combine, enlarge, or contrast a feature of the ICT with another feature |
| | 1.3 Constrain the use of a feature | From 'high' to 'low' | A feature of the ICT is interpreted or reinterpreted |
| | 1.4 Express judgements about a feature | From 'positive' to 'negative' | The use of a feature is judged as good, bad or neutral |
| 2. Faithful appropriation | 2.1. Use of ICT in accordance with its spirit | From 'high' to 'low' | Features of the ICT are used in line with its general intent regarding values and goals of the features |
| | 2.2. Use of ICT with the aim to advance its spirit | From 'high' to 'low' | Features of the ICT are used in line with but also with the aim to improve and sharpen the features' general intent |
| 3. Attitude towards appropriation | 3.1. Perceived usefulness | From 'high' to 'low' | The features of the ICT are judged as helpful and supportive to the tasks to be carried out |
| | 3.2. Perceived ease of use | From 'high' to 'low' | The features of the ICT are judged as easy to use |
| 4. Consensus on appropriation | 4.1 Identical ways of using ICT | From 'high' to 'low' | End users work with the features in similar ways |
| | 4.2 Written or tacit rules about how to use the ICT | From 'high' to 'low' | End users developed rules that are known among users about how to work with the ICT |

All expressions that could not be labeled with one of the proposed terms were labeled as ‘moderate’. The researchers were also open to new terms for labeling the expressions. This created the possibility for more refined labels.The next section presents the results of our analysis.

## 7 The Results

The discourse analysis has led to a long list of materials. We present a selection of the most characteristic expressions per dimension and the way we labeled it. We have chosen the sample of the expressions, which is in our view represents and covers all diverse interview postscripts. Appendices represent the analysis regarding the construct of organizational climate, and end user appropriation.

The boxes 7.1 and 7.2 present the result of our analysis (respectively time-1 and time-2).

Time-1. Climate for innovation implementation: considerably strong

The level of autonomy and responsibility delivered to the employees was moderate. They were strictly limited in the ‘exploring’ the system, and led by the project managers in most of the steps towards learning the system. There was no freedom in making choices for participating in educational courses, peer guiding, frequency of use and experimenting with the system at the beginning. At the same time taking initiative was not forbidden: skillful and experienced employees took the decision to write manuals and arrange additional instructions for their colleagues.

There were lots of different learning opportunities: educational software courses, peer teaching, manuals, and experts consultations. Info bulletins kept on providing job aids.

Group collaboration was strongly stimulated through organizing regular discussions about ongoing problems in use of the system: once a week with the whole department, and every day during coffee pauses. On-line chat aimed at exchange of experience and ideas.

Project managers were highly supportive and open for any discussions and help. They were oriented towards mutual learning the system together with the end users. They participated in all meetings and guaranteed help always just-in-time.

Feedback was considerably disappointing. All mistakes made by the users were pointed immediately. But the employees were not rewarded and recognized for lots of efforts invested in learning the new system.

End-users felt high time pressure during first months. Officially they had two hours a day during first month to experiment with the system, but the amount of their daily tasks remained the same. Later they had to switch to a new system, at once without any individual differences. Days off and vacation days were forbidden to take during first three months.

Despite autocratic and strict atmosphere within the targeted departments, the implementation climate was considerably strong because the use and learning of the new ICT was highly valued.

### Time-1. Appropriation of the ICT in the beginning: low to moderate

Employees' level of direct use in the beginning was immediately quite considerable already. Refusing to use the new system was not the case. Even attempts to enlarge the possibilities of the system were undertaken. Judgements about features of the system were hardly expressed in this stage.

Use in accordance with the system's spirit was quite low. Employees carried out tasks manually that were meant to carry out through the system. Sometimes this was due to a lack of knowledge, sometimes this was due to technical problems.

The level of use of the system in order to advance its spirit was quite high. A number of employees was curious about discovering the possibilities of the system to improve its aim.

The system's usefulness was not really recognized in the beginning, its easiness of use was considered as low to moderate. To switch from the old system to the new was difficult, although for younger employees it was less a problem.

Employees had a lot of questions about how to work with the system. Therefore, identical ways of use were not really the case. The same can be said about the existence of written or tacit rules among employees about how to work with the new system.

### Time-2. Climate for innovation implementation: weak

Just a few users wee given an official authority to explore further the possibility with ICT to improve the jaob performance. But mostly this issue was even not relevant for all users.

The level of providing different learning resources was not adequate to the current needs of the users. Especially it concerned new employees who joint the department during this stage. They felt a lack of any additional information to learn how to use the system. The only source for them was – experienced colleagues who had to find time to explain the characteristics of the system. Manuals and official documents were not up-dated in accordance to the latest improvements in the system.

Group collaboration was supported quite weakly. Regular discussions did not take place any more, only in cases of emergency.

Managers were still willing to help and give any consultations. But the employees felt that the project was frozen in comparison with the first months. Project team members did not ask about the users' opinions of on-going implementation. Only unexpected problems stimulated situational discussions and evaluation.

The level of recognising and rewarding successful and creative implementation was disappointing. Only mistakes and problems were pointed out.

End-users did not have special time to try more difficult options in the system.

Time-2 Appropriation of the ICT in stable use stage): Moderate

Direct use in the stage of stable use was quite high. Employees really used the system considerably. Combining, substituting, or enlarging features, however, was not recognized in this stage. Also reinterpretations of the system were not really made. Employees found a certain basic and stable interpretation.

They were critical about a number of features of the system or the system as a whole, but the group of positive employees was considerable.

Use in accordance with the system's spirit was not broadly the case. Quite some employees did not want or could not use the system in line with its spirit. Others feel that they are doing quite well. Use with the aim to advance the spirit was moderate. Attempts to improve were there, but not very ambitious. On the other hand, how to go on and develop use of the system was also recognizable with part of the employees.

Without doubts employees acknowledged the usefulness of the system in the stable use stage, as well as its easiness of use. Different ways of use exist, although a steady growth of a similar way of using the system was visible. Written or tacit rules surely were developing in this stage.

## 8 Conclusions and Discussion

This paper's aim was to explore the relationship between the concept organizational climate for innovation implementation and end-user appropriation of ICT. In the former section we presented the results of our discourse analysis. It made clear that in time-1, in the situation of a strong organizational climate, the overall level of appropriation was characterized as low to moderate. Learning opportunities were really stressed, which facilitated employees to direct use the system and to perceive the system as easy to use. However the strong organizational climate for innovation implementation could not prevent the low level of use in accordance with the systems' aim.

This is not in line with our basic premise. Interesting is it to observe that in a strong organizational climate for innovation the leve of use with the aim to advance the goal of the system is quite high. What could also not be prevented in time-1, in the situation of a strong organizational climate for innovation, is the low level of consensus about how to work with the system.

In time-2 the organizational climate for innovation implementation was weak and the overall level of end user appropriation of the ICT was moderate. In comparison with time-1 the climate changed and so did the level of appropriation. However, the direction of change of both concepts was surprising if compared with our basic premise. We expected that the relationship between the two concepts would show a certain kind of 'fit'. A strong organizational clime for innovation implementation was expected to make a 'fit' with a high level of end-user appropriation, as a weak climate was expected to 'fit' with a low level of end-user appropriation. Will our in-depth study, by means of discourse analysis, makes us to come up with a different conclusion? At least we have to look for an explanation for the unexpected result.

In our view the presented can be explained by redefining the relationship between organizational climate for innovation implementation and end-user appropriation as presented in our basic premise. It is very well possible that organizational climate is a precondition in advance for enabling end-users or employees to appropriate new ICT.

To illustrate this: already before end-users are offered a new ICT the organizational climate for innovation implementation has to be strong, or at least prepared in such a way that appropriation is facilitated as soon as end-users have to start to work with the ICT. In other words, the level of appropriation 'follows' the organizational climate. In our case study it is very well possible that the organizational climate just before the implementation was still weak, but when the ICT was offered to end-users the management undertook very strict and thorough action to create a strong climate during time-1. The low overall level of appropriation of the ICT by end-users may have 'affected' the organizational climate to become weak in time-2. This happened while the level of appropriation itself made even a certain progress 'affected' by the strong organizational climate in time-1. Figure 2 presents the redefined basic premise about the relationship between organizational climate and end-user appropriation.

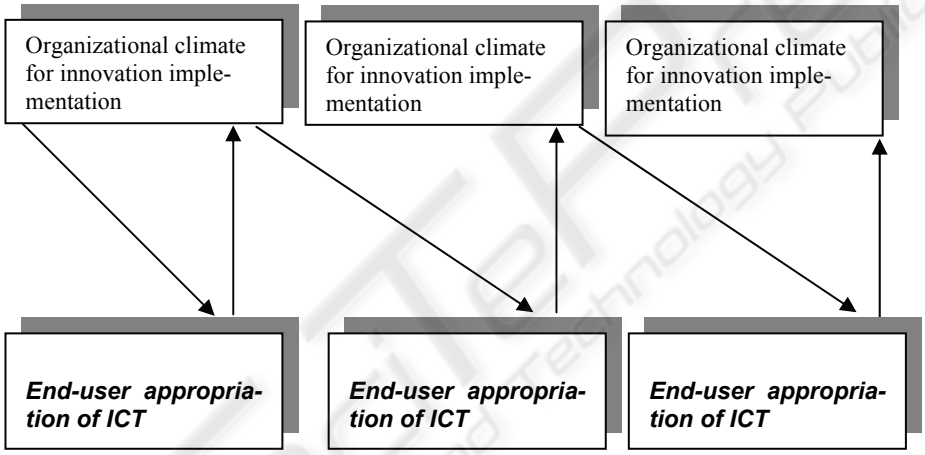


**Fig. 2.**The redefined relationship between organizational climate and end-user appropriation.

In sum, we believe that we have to redefine our basic premise about the relationship between organizational climate and end-user appropriation. These two concepts are not related in terms of a 'fit' in a certain situation, but one concept 'follows' the other over time. It takes time, so to say, for one concept to adapt to the other. In our case study, in which we carried out a discourse analysis, we assume that in time-1 end-user appropriation 'followed' the organizational climate in time-0 (the pre-appropriation stage), and that end-user appropriation in time-1 'affected' the organizational climate resulting in a weak climate in time-2, and so on. In conclusion, organizational climate for innovation implementation and end-user appropriation of ICT are related in an 'action-reaction' relationship. Of course, we are aware of the limitation that we only carried out one case study and therefore more case studies are necessary. It would even though be interesting to start new case studies from this

redefined point of view and it would be interested to look at the 'mechanisms' that lay under this relationship.

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