Working apart together: using ICTs in research collaboration
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1. Media configurations

The aim of this chapter is to introduce a theoretical framework which will help us conceptualise ICTs and communication media, on the one hand, and on the other, how communication media influence social action (and thus research collaboration) and also how social action may influence the use of communication media. As noted already, the introduction of ICTs has resulted in a hybrid communication environment, in which the distinction between on- and offline practices is not clearly discernible. Thus we need a framework which can encompass the whole spectrum of communication media used, and can help us understand how different media influence research collaboration. At the same time, this framework needs to explain not only how media may influence research collaboration, but also how research collaboration may influence the use of different media, allowing thus a bi-directionality of their relationship. This chapter presents elements for such a framework and tries to answer the following questions: How can we understand the role of ICTs in a wider communication environment? How do communication media interact with each other? How do media influence social action, and how does social action influence the use of communication media? How can we study this bidirectional process?

There are two theoretical strands on which the current chapters draws. The first can be broadly defined as media ecology or media environment, and it includes theorists such as Meyrowitz, and Postman, from traditional medium theory, but also Nardi and O’Day, who theorize information ecologies. The common theme here is a focus on media as “environments within which [humans] move and that shape the structure of their perceptions, their forms of discourse, and their social behaviour patterns” (Heise, 2002: p 151). It is a focus not on media as content or language (Meyrowitz, 1993) but on media as environments or as contexts and the interrelations of communication media in a given context.

The second theoretical strand focuses on communication as cultural transmission, which was elaborated by J. B. Thompson (1990; 1995) and applied on the study of the internet by J. Slevin (2000). According to them media can be considered as specific modalities of cultural transmission and they allow distinct types of interactions between individuals. These interactions create a distinct kind of public sphere within which cultural products circulate.

Following this literature review, I will introduce two main issues relevant for the current dissertation: the first is the interaction between different media, what some studies have discussed as substitution, or reconfiguration, and the second issue is the dynamics of media use in time.
A. Media as environment

The *media ecology* or *media environment* paradigm holds that media are not mere tools that we use but constitute environments with intricate interconnections, which shape our behaviour in an implicit way. There is a tension in this paradigm: on the one hand, theorists such as Postman and Meyrowitz emphasise a holistic, systemic approach to media. They hold that communication media function as a system with its own logic. On the other hand, Nardi and O’Day use the ecology metaphor to emphasise the local context of media use and to encourage human agency and intervention in that context (Heise, 2002). Nevertheless, the paradigm emphasises that communication media are linked in intricate ways with each other, and with behavioural elements: in this way the introduction of a new medium doesn’t “add or subtract something. It changes everything” (Postman, 1993: 18). It alters the whole configuration of media and their interactions, and creates a new environment. Hereunder, I especially draw on Meyrowitz (1985; 1986; 1990; 1994).

But in which way do new media create a new environment? According to Meyrowitz this is a twofold process: on one hand the introduction of a new medium to a culture changes the functions and impact of earlier media. The underlying principle of this mechanism is rooted in systems theory: “When a new factor is added to an old environment, we do not get the old environment plus the new factor, we get a new environment… the new environment is always more than the sum of its parts” (Meyrowitz, 1985; p 19). In this sense, the introduction of a new communication medium results in a new communication environment and a redefinition of the function and uses of other communication media.

On the other hand, media play a role in defining the boundaries of social situations. A situation can be understood as an information-system, that is, as ‘given pattern of access to the behaviour of other people’ (Meyrowitz, 1985; p 37). In this way the introduction and widespread use of a communication medium may provide access to new sets of situations, while withholding access to other situations. This change in access to social situations, in turn, may change social identities: “Social identity does not rest in people, but in a network of social relations. When social networks are altered, social identities will change. In any given period, roles are shaped as much by *patterns* of access to social information as by the *content* of information” (Meyrowitz, 1994; 58-9).

Meyrowitz suggests that different media may increase or decrease the amount of shared social interaction for different people, bringing thus a change in social roles and identity. In order to study the effects of the introduction of a new medium we need to consider thus “who shares information with whom” through this new medium. In general, the more situations and participants are segregated through segregated access to media, the greater the differentiation in social status, identity and behaviour. Conversely, the more social situations and participants overlap through general access to media, the less differentiation in status and behaviour there is (Meyrowitz, 1994; p. 59). In this respect, the degree of access that different media afford leads to changes in social identity at the level of the individual, which would enable or inhibit the emergence of shared identity. A
segregated medium would lead to the emergence of different individual identities, and would thus inhibit the development of a shared identity. An open-access medium would lead to common social identities of individuals and would thus enable the emergence of a shared identity.

However, the degree of access to social situations is not the only factor involved. A more subtle but vital point is raised about the explicitness of access to information established by different media: “New access to information will not necessarily affect social interaction unless everyone involved knows about the access. Or, put differently, knowledge of people’s access to information is itself a significant piece of social information.” (Meyrowitz, 1985; p 91). So it is not only the general accessibility to a medium that influences behaviour and individual identity, but also the knowledge about this accessibility.

For Meyrowitz group identity and group hierarchy are enactment of social roles which are information-sensitive, and this is why they can be influenced by the introduction of new media. Group identity entails roles of affiliation and depends upon “secret but shared information”, so information common to the members of the group, but that needs to remain inaccessible to outsiders. In this respect communication media, which afford explicit access to all members of a group, but not to outsiders, would promote the emergence of group identity. Group hierarchy rests upon one-directional access to information, and control of information. Therefore, media which support one-directional access to information would tend to promote hierarchical distinctions, whereas the bi-directional flow of information would tend to decrease hierarchical distinctions. So, the directionality of information flows that a medium enables can influence the hierarchical structure of a group.

From the discussion above it can be deduced that communication media can influence research collaboration in two ways: first by changing the functions and uses of earlier media in research collaboration (such as e.g. face-to-face meetings or the telephone) and bringing about a new communication environment. Second, by giving access to different social situations (defined as information systems). With respect to that, there are three elements of media that are of importance: first the degree of access they give to different participants; second the explicitness of access; and third the directionality of information flow they allow. Especially regarding the collaborative team, media may influence both the hierarchical structures of the team as well as the emergence of a team identity, by providing differential access to members and by allowing different flows of information.

However, medium theory is not without its limitations; one of the more precise formulations of critique comes from Meyrowitz himself (Meyrowitz, 1994: 70). First, the influence of media that the theorists are looking at is very difficult to demonstrate with social-scientific models, especially because they are at a macro level of analysis. Thus, they have to rely on argumentation, historical analysis and large-scale pattern identification. This aggregated level of analysis also makes it impossible to conceptualise and understand human action with communication media, as Nardi and O’Day suggest. This level of analysis also means that medium theory is not particularly useful for
understanding how media are used in everyday interactions. In general, the critique is that medium theory tends to be technologically deterministic by focusing on how media alter and shape human interactions, and not the other way around. This limitation is addressed by Nardi and O’Day (1999) and the way they conceptualise information ecologies, as we shall see below.

The second problem with medium theory is that it overlooks the significance of the type of content which is circulated through communication media. Especially in the context of research collaboration, it makes sense to think that it makes a difference not only who meets with whom in a laboratory, but also what exactly is discussed. In this respect, both Thompson (1995) and Slevin (2000) argue for an understanding of media as means of cultural transmission and they re-introduce the importance of what is communicated, as we shall see in the following section. However, medium theory remains a powerful way in which we can conceptualise how the differences between communication media make a difference (see also Meyrowitz, 1986). As the aim of the dissertation is to identify the influence of ICTs, and more generally of different communication media on research collaboration, an understanding of how ‘the differences among media make a difference’ is essential (Meyrowitz, 1993: 61).

With the advent of new media, an influential perspective of identifying “the differences among media” has been one relating to the “richness” of media, media richness theory (Daft and Lengel 1984; Daft et al. 1987). Media richness theory assumed that ICTs inherently reduce the amount of nonverbal and contextual communication cues and therefore by definition are poorer than other forms of communication, such as face-to-face (also called the reduced social cues model). This would mean that ICTs cannot be successfully used for ambiguous communication and their use leads to anonymity (see also the discussion in chapter 3, section C). The main problem of media richness theory is that it does not take into account the given context of communication (the social situation defined by Meyrowitz), and assumes a uniform impact of ICTs. Moreover, the time dimension is not taken into account, as media technologies evolve and users also adjust their norms and practices over time. Finally, the content of the communication itself is also not taken into account (for a critique and empirical rejection of the theory see also Rasters 2004).

But how about the way in which communication media are used in a specific context? This study is focused on research collaboration, and more precisely on FP project collaborations. How can we move one level of analysis down from medium theory, and conceptualise the ways in which media are used? The concept of “information ecology” is here useful to address the context in which interactions take place. For Nardi and O’Day (1999) the starting point is how to engage successfully with technology, in an attempt to bring human intentionality and accountability to the use of technological tools in general. They see a problem with Postman’s view that “technology has its own agenda” (ibid. p 42) and with medium theory in general, because it cannot address the issue of particular local change. They define information ecology as “a system of people, practices, values, and technologies in a particular local environment. In information
ecologies, the spotlight is not on technologies, but on human activities that are served by technologies” (ibid. p 49).

Information ecologies are complex, since they consist of people, ideas, habits and communication tools that are connected in intricate ways. However, they do not have the large scale that the systemic view suggests, since they respond to local environmental changes and local interventions. Therefore, the main difference between the two approaches is one of scale, since for Nardi and O'Day information ecologies have a sense of locality. Information ecologies, they claim, exhibit diversity and continuous evolution. “Different parts of an ecology coevolve, changing together according to the relationships in the system” (ibid. p 51). The introduction of new people, ideas, or media results in a mutual adaptation of other parts of these complex systems. Social behaviour and information tools (as they define media) adjust and are adjusted in relation to each other, in time. In this way, “[w]hen one element changes effects can be felt throughout the whole system” (ibid. p. 51).

In this way, the introduction of ICTs cannot be understood as an “addition” of a new medium for research collaboration. It needs to be conceptualised as redefining the functioning of research collaboration, altering the interconnections between other communication media. At the same time, however, research collaboration also alters and shapes the way ICTs and other communication media are used in a local context. Rather than focusing on media per se (which medium theory does), Nardi and O'Day focus on media use, suggesting a lower level of analysis. At this level, the local context, the study of the intricate ways in which people, practices, and communication tools interact suggests that social behaviour also shapes the use of media (in contrast to media shaping social behaviour, according to medium theory). Therefore, we can understand how patterns of research collaboration influence the use of communication media, by examining at a lower level of analysis the everyday practices and interactions of people, routines and media (putting “the spotlight… on human activities”). At the same time, we can understand how different communication media influence research collaboration at a more aggregated level of analysis, by looking at patterns of access, of explicitness of access, and information flows between different media, as suggested by Meyrowitz. So we can understand the research object of this dissertation as an interaction and mutual shaping between research collaboration and the use of communication media.

But how do everyday practices change and alter the use of communication media? This is elaborated in the concept of “identity of technologies”, which refers to the ways in which the local participants in an information ecology through their patterned use in time construct the function of the media. In an information ecology the communication media assume an identity through their patterned use; this media identity may also change through time. ‘The identity of the technology is different in each of these local settings because the perceived role, availability, utility, and other properties of the machines are different’ (ibid. p. 55). Therefore, the “identity of technologies” refers to the functions of communication media in a local context, their patterned use through time. This means that by examining everyday practices and how they are structured through time, we can
understand the role and function of communication media, and how they may change through time.

To summarise, different communication media may influence research collaboration in two ways: by changing the functions and uses of earlier media in research collaboration (such as e.g. face-to-face meetings or the telephone) and thus bringing about a new information ecology. Second, by giving access to different types of social situations where three elements of media are of importance: first the degree of access they give to different participants, second the explicitness of access, and third the directionality of information flow they allow. If we focus on a research team, media may influence both the hierarchical structures of the team as well as the emergence of team identity, by providing differential access of information to members and by allowing for different flows of information. The study of how different media influence research collaboration needs to focus on the specific characteristics of different media and what difference they make, with a large-scale pattern identification, at the more aggregated level of the research collaboration.

At the same time, however, the everyday practices and activities of research collaboration may influence the use of different media in the local context. This can be understood in the context of an information ecology, which as a unit of analysis encompasses not only communication media and the ways they interconnect, but also the research collaborators, their routines and everyday practices. Moreover, through their everyday activities, collaborators construct media “identities”, which refer to the role and function of media in the context under study. So, the influence of everyday activities on the use of media needs to be studied at a lower level of analysis, with a focus on the context of everyday use, and a longitudinal approach.

But even though both approaches, medium theory and the theory of information ecologies, are useful in understanding how “different media make a difference” and how social behaviour and communication media interact and mutually shape each other, they fail to examine the content of media, as suggested before. In research collaboration, where most of the times the aim is to produce knowledge, the content of communication becomes vital. How can we understand the differences between media and the role they play in research collaboration, incorporating the content? The theory of cultural transmission can provide some useful guidance.
B. Theory of cultural transmission

Whereas Nardi and O’Day and Meyrowitz are useful for positioning new communication media in a broader communication and informational context, and identifying their influence, they do not provide any indication on how to view different types of content circulated through communication media. This is elaborated in the theory of cultural transmission introduced by J. B. Thompson (1990; 1995) and applied to the internet by J. Slevin (2000). Their approach to communication media is “cultural” in the sense that it is concerned with “the meaningful character of symbolic forms and with their social contextualization” (Thompson, 1995: 10 italics in the original). On the one hand, communication media are involved with the production, storage, and circulation of content (symbolic forms) which has meaning for the individuals involved in the process. This focus on the meaningful character of the content of media for the individuals means that a study of media cannot exclude a study of the content of communication, as well as its meaning for the participants. If we think about research collaboration we can understand how a brainstorming session on the results of analysis between two collaborators is a fundamentally different communication activity than a meeting in which two collaborators discuss funding options for their project and decide to apply to one or another agency. The meaning of what is communicated for the two participants is different in the two cases.

On the other hand, communication is always taking place in “social contexts which are structured in various ways, and which, in turn, have a structuring impact on the communication that occurs” (ibid. p. 11). Thus, a study of communication media always involves a study of the context of their use and the ways in which this context is structured. This relates to the focus of Nardi and O’Day on the local environment of information ecologies, but also stresses the fact that this context is always structured in some way: the individuals have different positions in this context, which relates to their relative economic, political, coercive and symbolic power¹. This positioning of the individuals according to their relative power structures the communication and is structured by it. With respect to research collaboration, e.g. a PhD student is positioned differently to her supervisor during their meeting, and their communication activity is structured by this difference in power, but may also alter this difference in power.

Thompson’s conceptualisation of communication media incorporates the institutional apparatus (rules, resources and relations relatively stable in time), the relationship between the participants in the communication process, the time-space context of communication and the kind of public sphere that is created. Against this backdrop he discusses how mass media created new kinds of action and interaction, how their development was integrated into the process of globalisation and how they have affected traditional notions of publicness. Slevin (2000), using Thompson’s framework, examines

¹ Power is understood in this context as “the ability to act in pursuit of one’s aims and interests, the ability to intervene in the course of events and to affect their outcome” (Thompson, 1995: 13).
the internet as a modality of cultural transmission and introduces the ways in which the internet has brought about new types of interactions which shape and are shaped by the social context in which they function. However, we need to keep in mind that Thompson’s framework was developed for the study of mass communication, and Slevin’s elaboration refers to “the internet” in general, without a distinction between different modes of communication (email, websites, etc). These points will be useful in the discussion below.

If we think about communication as a contextualised activity we can also understand how different types of contexts, in terms of time and place, will involve different ways of communication. One of the important characteristics of communication media is that they allow different types of interactions between the participants, which combines a distinction between spatio-temporal contexts with the direction of the information flow that Meyrowitz also stressed. Thompson introduces three types of interactions (1995: 82-87):

1) face-to-face interaction, which takes place in a context of co-presence, and thus involves a sharing of the same spatio-temporal coordinates between the participants, and rests on two-way flow of communication;
2) mediated interaction, in which the participants do not need to share the same temporal and local context, but still rests on a two-way flow of communication. It involves a technical medium of transmission, such as e.g. telephone, or email.
3) mediated quasi-interaction, in which the participants do not need to share the same temporal and local contexts, and it involves a one-way flow of communication, a transmission of content from a sender to a receiver. Examples of this type of interaction can be a television transmission, or an uploading of a document on a website.

We can understand different media as allowing different types of interaction, and therefore different relationships between the communication participants and different relationship with the medium itself. Following this typology, the abstract notions “internet” or “ICTs”, which include more than one type of interaction, can be analytically distinguished. The interaction that a website allows (mediated quasi-interaction) is different to the one personal email or an emailing list allows (mediated interaction), and in this way it involves a different relationship between the participants in the communication process. Extending on this distinction, we can also think how mediated quasi-interaction can be studied from two distinct analytical perspectives: the perspective of the sender and the perspective of the receiver. For instance, studying quasimediate interaction through a website may involve downloading a document from a website or uploading a document, which are different communication activities because of the different directionality of interaction.

The new type of interaction that mass media allow (mediated quasi-interaction) is related to a new kind of publicness, as visibility, functionally and substantially different from our traditional conception of visibility, which was restricted to face-to-face interactions. “… [I]t is a publicness of openness and visibility, of making available and making visible, and this visibility no longer involves the sharing of a common locale” (Thompson, 1995: 83)
The public sphere, or sphere of the visible, rising within means of mass communication is “the non-localized, non-dialogical, open-ended space of the visible in which mediated symbolic forms can be expressed and received by a plurality of non-present others” (ibid. p. 245).

Mediated publicness is non-localized in the sense that it is not tied to a specific locale with specific temporal coordinates, but it extends well beyond it, being potentially global. In this sense it is “an opening, a sphere of possibilities in which mediated symbolic forms can appear” (ibid. 246). Moreover, it is non-dialogical, in contrast to the sphere opened up by face-to-face interaction or mediated interaction (e.g. through the telephone). There are producers bestowed with the role of sending symbolic material, and receivers who may or may not respond to the producers (via another medium, however), whose relationship to each other remain fundamentally asymmetrical. Further, the sphere is described as open-ended in the sense that is a “creative and uncontrollable space, a place where new symbolic forms can be expressed … and where the consequences of becoming visible cannot be fully anticipated and controlled” (ibid. 246-247). Finally, the participants within the sphere are numerous and belong to different spatio-temporal contexts.

From this characterisation we can deduce the parameters which can help us understand the distinctive type of visibility emerging by different types of interactions. The parameters that Thompson used are a. the extension of availability of the interaction in space, b. the kind of interactions between the participants, c. the degree of control of the circulated content and finally d. the extent of participation. Different media create different types of publicness as visibility, which can be understood in terms of these four parameters. Following this argument, Slevin (2000) discusses how ‘the internet is radically transforming the nature of the public circulation of symbolic forms’ (ibid. 76). The public space created by the internet is: a. non-local and, in contrast to older media, indeed world-wide, b. closer to be considered a ‘dialogical space’, since the user can be a sender as well as a receiver, c. open-ended, as there is virtually no control of the symbolic content on the web, and d. bringing together a plurality of non-present users, instead of recipients vs. senders (ibid. pp. 183-184).

However, the type of visibility brought by a restricted-access website and an open emailing list are quite different, not only in terms of the types of interactions involved (quasi-mediated vs. mediated) but also in terms of participation. Therefore, we cannot bundle together different modes of communication under the term “the internet”, but it becomes rather an empirical point of analysis to understand what type of visibility is created by which communication medium. This is important since, as both Thompson and Slevin point out, the type of publicness that different media create is related to the impact they may have in situations. For instance, Thompson discusses how mass media related to the events following the collapse of the Berlin Wall, as millions of people from East and West Europe were watching on television, with the explicit awareness that they were all watching it. This is similar to the argument Meyrowitz makes about the explicitness of access to situations that media afford. In order to understand the influence
that communication media may have on research collaboration, we need to explore what type of visibility each medium creates.

To summarise, according to the theory of cultural transmission, the content of what is communicated and its meaning for the participants in the communication are important. Moreover, communication is always a process which is contextualised, so we need to turn our focus not only to the study of media in a context, but also to the different positions the participants have in that context, which relates to their relative power: the degree to which they have differential access to resources. Furthermore, there are different elements on the basis of which different communication media can be distinguished: a) how extended is the interaction in space, b) what type of interaction is created (face-to-face, mediated, quasi-mediated with two different directional flows), c) the degree of control of the circulated content and d) the extent of participation [which is the same with the patterns of access Meyrowitz suggests], e) the explicitness of access and f) the direction of the informational flow. These elements can help us understand the impact that different communication media may have in a social situation.

For instance, in the context of an international research team, there are interactions which are bound by space, such as face-to-face meetings, and others which are not, and these include technical media such as the telephone. Moreover, in the same context, the type of interaction created by an emailing list (mediated) is different to that of the attachments through the same list (mediated quasi-interaction). The degree of control of the circulated content relates to the regulations of what can be communicated in a face-to-face meeting (for example who has control of the agenda), or for instance who has the technical ability to upload documents in the team’s online repository. It may also involve implicit and explicit regulations of what types of emails can be sent to the general list. Furthermore, the extent of participation of different members in communication media and the explicit knowledge of access to the media creates the distinction between personal media (participation of two or more participants) and team-level, public media (explicit knowledge of participation of all team members) and other forms in between, for instance semi-public (for an email sent to most but not all members in a team). In this respect, there is also a difference between a personal email between two members with a Bcc to the rest of the team members, and an email sent to the general list where all team members participate. Finally, the direction of the information flow is related to who initiates the communication through mediated and face-to-face interactions. These elements will come back in the analysis.
C. Synthesis

In this section I synthesise the theories presented here and identify a framework of how communication media and their use can be studied in the context of research collaboration. First, even though ICTs are the new communication media used in research collaboration (Hackett, 2005a), the analytical focus should not only be on ICTs, but the whole media environment, the systematic interconnections of communication media, as suggested by Nardi and O’Day. New communication media may alter the use and function of older media in a context, and this should also be investigated. Moreover, the term “ICTs” needs to be un-bundled as it actually consists of different communication media, which may alter the dynamics of research collaboration in different ways. I wish to introduce here the concept of media configuration, which refers to the systematic interconnections between the use communication media by a team. With this concept of media configuration I aim to capture the following elements:

a) the types of media used by the team: as discussed by medium theory this refers to the characteristics of media per se, e.g. their degree of publicness, or their extension in time and space. These are characteristics which may influence the hierarchy in a team, or the emergence of a common identity.

b) the content communicated through that media: this relates to the theory of cultural transmission, and also what Nardi and O’Day call “media identities” the routines that the media are used for, and the practices for which they are used. If one team uses meetings to solve conflicts, and another team uses meetings to discuss the content of research work, the practices that meetings support in the two teams are different, and thus the content that is communicated is different.

c) frequency of media use: As pointed by Meyrowitz (1985), the introduction of television does not necessarily lead to a demise of books. However, in modern societies, people spend much more time on watching television than reading books. The frequency of television use, in relation to other media, therefore, is also a relevant dimension.

First, the concept of media configuration introduces the idea that the use of media has an overall structure, and that the use of one medium (e.g. email) can only be understood within a repertoire of other communication media. Thus the use of ICTs (e.g. emailing list, blackboard, website) will be studied together with the use of other means of communication, such as face-to-face meetings, telephone, fax etc. The point of this investigation is the systematic interrelations of media, keeping in mind the distinctive characteristics that each communication medium brings forth.

Second, this definition emphasizes that media use is always contextualized in time and space, in an information ecology. This conceptualization indicates that media configuration is not a static but a dynamic element and we need to trace it through time. The media configuration in a team may entail different aspects, different combinations of media, at different time periods, as new media are introduced and others may be abandoned. This dynamic element refers to all three dimensions of media configurations: the type of media used by a team may change over time, as a new medium is introduced.
and an older one is abandoned. For instance, after the course of time, face-to-face meetings may become more and more frequent. This will inevitably change the frequency of use, or the role of other communication media, since they constitute an “information ecology”. Further, the content, or functions of media may change over time: emails may be used in the beginning to allocate tasks among team members, but may increasingly be used more to discuss the research content as the work progresses. Finally, the frequency of media use may change: meetings may decrease in frequency over time, or the distribution of emails over time may be stable or only concentrated in specific periods. All these elements show how media configuration may change over time.

In addition, we may expect, for example, that increasingly frequent emails reflect either high efficiency of previous email communication, or the inadequacy of other communication media previously used, so that a change in the frequency of use of emails may be related to their past use. This, in turn, points to the idea that media configuration in a context is a dynamic element, and differs from one period to another. This should be manifest in changes in the type of media used, changes in the content of media and the functions they sustain, or changes in the frequency of media use of a medium, or a combination of the above.

Unfortunately there has been little interest in communication studies with regards to how different media and their use changes over time in a specific context, which may result from the difficulty of conducting longitudinal studies. What is the underlying process of media use in time? Do different media follow the same process of use in time? How can we compare the different processes? These are questions that will be discussed in the empirical chapter. Even though face-to-face meetings are not technical media as such, they nevertheless belong to the means of communication of a system and influence and are influenced by the patterned use of other communication media, as discussed by Nardi and O’Day. The concept of media configuration, thus attempts to capture these three characteristics: the type of media used in a team, the content of what is communicated, or else the functions that the media support, and the frequency of media use. Therefore the first research question of the dissertation becomes:

_How do media configurations influence research collaboration?_

Media configurations may influence research collaboration, insofar they consist of different type of media creating a different type of publicness or visibility. In other words, following Meyerowitz and Thompson, this research question refers to the effect that each medium has on collaboration practices: How does the use of emails, in comparison to meetings, influence a decision making process in a collaborative team? In this respect, ‘the differences among media’ can be analysed in terms of the following characteristics: a) how extended is the interaction they allow in space; b) what type of interaction is created (face-to-face, mediated, quasi-mediated with two different directional flows); c) the degree of control of the circulated content; d) the extent of participation; e) the explicitness of access, and f) the direction of the informational flow. The distinctive types of visibility that communication media allow may influence team hierarchy, and in this sense a focus on the different power positions of the participants in a context comes into focus as well. Moreover, they may influence the emergence and
development of team identity, insofar as they may provide access to information and communication to the members of the team, but not to outsiders. Therefore, the first question translates to:

*How do differences among media influence research collaboration?*

Further, the functions that the media support may influence research collaboration. For example, the use of telephone, which is a private and not public medium, may preclude the emergence of a team feeling in collaboration (Rasters, 2004; see also next chapter). Finally, the increase or decrease of frequency of media use may also influence dynamics in the collaborative endeavour. Therefore the following questions can also be explored:

*How does the content and functions of media influence research collaboration?*

*How does the frequency of media use influence research collaboration?*

On the other hand, the dynamics of research collaboration may also influence media configuration (the content and functions of media, and the frequency of media use). With regards to the type of medium used and the differences among media, we can hardly expect collaborative practices to influence innate characteristics of media such as publicness or information flow. However, we can imagine collaboration practices influencing the content or functions of media used: an urgent deadline may result in emails being used more to communicate research output than anything else. Finally, we can also imagine that dynamics in a collaborative endeavour may lead to a decrease in the frequency of communication, for instance, during a period of summer holidays. The second research question thus becomes:

*How do activities in research collaboration influence the content communicated through media?*

*How do activities in research collaboration influence the frequency of media use?*

These questions will be further elaborated in the next chapter, after a discussion of the concept of research collaboration. What are the activities of research collaboration? How can we understand what research is about at an everyday level of analysis? The following chapter will elaborate the concept of collaboration, and specific working processes in research collaboration.