Working apart together: using ICTs in research collaboration
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6. DELTA case study - Collaborative practices

This chapter draws on the analysis of the previous chapter, as well as new analysis to answer the research question *How do differences among media influence the working practices in research collaboration?* It is divided in five sections, corresponding to the five issues addressed in the literature review (chapter 3): decision-making processes, conflicts, socialising, coordination and task allocation, and output production.

A. Decisions

The literature review on the influence of different media on decision-making processes showed that it is still an open question. Some argue that the use of ICTs alleviates status differences between the participants (as an intervening variable influencing the decision-making processes), making thus research collaboration processes more participatory (Walsh and Roselle, 1999; Finholt, 2003). Others disagree (Matzat 2004), and suggest that ICTs tend to reinforce the organisational hierarchy (Ducheneaut, 2002). Here, I first explore the extent to which ICTs are used in a different way by central and peripheral researchers. The use of communication media is studied with regards to two different dimensions, the frequency of use of ICTs, and the initiation of communication (see Shinn, 1982). We would expect that central members in the team would participate more, and that they would be the ones initiating communication, rather than peripheral members. Next, I explore how decisions were taken in the DELTA team, and examine whether decision-making processes through certain media were more inclusive than the ones through other media.

General list

Contrary to expectations, peripheral researchers participated more in the general list than coordinators. If we only take the active members of the list, there are 139 emails per coordinator, on average, and 158 emails per researcher on average. The increased participation of the researchers could be explained by the role of the list for general working-related communication and coordination of work: since they were doing the main bulk of the work of the project, their extensive participation can be explained. But do researchers participate more in the emailing list over time? Figure 8 shows the relative dominance of the coordinators over the period of 40 months in the emailing list.

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39 It is reminded that the distinction between peripheral and central researchers relates to the status of the members in the team. In this way, peripheral refers to younger researchers, not responsible for the management or the coordination of the project according to the EC.
40 This is taking only people sending at least 27 emails (1% of the list), to avoid overrepresentation of researchers who left after some stage in the project.
41 This figure presents the number of emails per coordinator divided by the number of emails per researcher each month. Time is here measured in months, and the line presents the moving average trend line of the data (period 2).
When the line is above 1, that means coordinators dominated the list, whereas when it goes below 1, researchers dominated the list. Overall, coordinators dominated the general list in a limited time period, only in the first phase of the formal start of the project. This means that their participation was more extensive during the setting up of the research design, and the literature review, which indicates a certain division of labour. This will be discussed further in the section about task allocation. Their dominance in the last 2 periods could reflect their overall responsibility for the finalization of all tasks of the project.

The project coordinator, Mario, accounted for 9.5% of all emails, and his participation was substantially larger in the beginning: during the finalization of the proposal, and until its formal start. Then, his participation in the list decreased considerably\(^\text{42}\). Moreover, there was no difference between researchers and coordinators in their initiation of communication and new topics\(^\text{43}\). Finally, contrary to expectations, researchers and coordinators alike sent the same percentage of attachments to the general list, and this did not change through time\(^\text{44}\). These results indicate that the general list was a rather participatory medium, allowing a balance between researchers and coordinators.

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\(^{42}\) The percentage of emails he sent to the list over the first three-month period was more than 19%, whereas the subsequent periods it dropped to 2-9%.

\(^{43}\) The database used was all emails (N=2726). I cross-tabulated the “Reply” indicator in the header of email with the hierarchical status of the communicator, but no statistically significant difference was identified, also when I separated the project coordinator from the other coordinators. In addition, no statistically significant result was found when the cross-tabulation was broken down by month.

\(^{44}\) The same database (N=2726). I cross-tabulated the number of attachments sent with the hierarchical status, and no statistically significant result was found. When “month” was inserted as a Layer only two months out of 40 gave a statistically significant difference.
Management list

For every local group there was one person in the management committee having access to the managerial list: the scientific coordinators in groups 1, 3, 4, 5 and Sophia, Karin and Irene (after week 113), who were respectively the representatives of the groups 6, 7, and 2. Researchers of the other groups were excluded from the managerial list, and therefore we would expect coordinators to dominate the management list.

In total, 31.6% of the emails was sent by researchers and 68.4% of the emails was sent by coordinators. If we take into account, however, the larger number of managers having access to the list, their dominance disappears over some periods of time.

![Relative dominance of researchers](image)

*Figure 9: Relative dominance of researchers in the managerial list*

The figure above (Figure 9) shows the relative dominance of researchers in the managerial list. When the line is below 1 it indicates that coordinators rather than researchers dominate the team. Even if there is no apparent increasing or decreasing trend over time, there were periods that the researchers dominate the list in terms of number of emails sent. So, in total, coordinators participated more in the managerial list, but not with a big difference to researchers. However, in the managerial list Mario played a much bigger role, sending overall one third of all emails and one third of all attachments. Moreover, he sent many more original contributions to the list, than researchers or other coordinators. In general, this shows a rather hierarchical top-down style of communication. It seems that Mario dominated the managerial list.

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45 I divided the average numbers of email per researcher by the average number of emails per manager. Again the line shows the moving average (period 2).
46 This was tested with OLS regression of the relative dominance of researchers, using time in months as the independent variable. The model was not statistically significant (N = 28; Sig. 0.372).
47 The cross-tabulation between “Reply” and status was statistically significant (Phi 0.210; Approx. Sig. 0.000) (N = 415); Around 50% of all original contributions were sent by the project coordinator.
So, the general list seems to be dominated by researchers, overall, and in time, with a limited role of the project coordinator, and the other coordinators. Moreover, the initiation of the communication and the exchange of documents are equal for both researchers and coordinators. The managerial list, however, seems to be dominated by the project coordinator, who is also responsible for the initiation in communication. It seems that the use of these two media influenced the status of the participants in different ways. But does this lead to more participatory decision-making processes through the general list? How did differences among media influence decision-making processes?

The literature review (chapter 2) suggested that decision-making is influenced by the existence and style of leadership, the levels of authority, the status of the participants and the degree of formalisation of rules. More specifically, given the nature of the collaboration under study (FP5 project), we would expect decision-making in the DELTA team to be formalised, and also complex, given the two levels of authority established (work-package leader and scientific/managerial leader).

The levels of authority in the DELTA team were actually four. Not only were they recorded in the contract of the team, but they also functioned in decision-making processes. As an FP project, DELTA had a managerial/scientific leader (project coordinator, Mario), and work package leaders. The third level of authority comprised of the management committee, composed by one representative of each group and chaired by the project coordinator, having responsibility for “strategic orientation and crucial decisions” (according to the contract). Finally, there were the local authorities, who had the responsibility for the part of the project that corresponded to each local group. These levels were often intertwined in decision-making processes in such a way that they held each other in balance. In general, the multiple levels of authority in the team resulted in complex decision-making processes, as well as tensions and conflicts between the different levels, as will be analysed in the next section.

Mario, as the project coordinator, was sometimes asked explicitly by team members to take a decision. Other times, especially on scientific issues, he raised an issue and left the decision to the whole team, not interfering. Often, however, he functioned in an authoritative way. On the issue of budget re-allocation between the members of the consortium, Mario left only one option to the team, vetoing all other possible solutions, and creating thus a bottleneck in the decision-making process. Or, in discussions about possible dates for meetings, he attempted to “summarise” the team’s public online discussions too early, leaving out options that did not suit him. Other times, he referred to his power to distribute the funds from the Commission in an attempt to persuade the team to follow his suggestions. Therefore, his style of leadership was at times authoritarian (especially in decisions about the budget or meeting dates) and at times facilitating.

The management committee consisted of a member from each group48 of the consortium: Mario, Yiannis (until week 113 and after that Irene), Franco, Markham, James, Karin and

48 Apart from group 8, which was not a principal investigator.
Sophia, and, apart from managerial issues such as budget reallocation or delays, it also decided when the meetings would take place. Its authority however was not as straightforward, as the following example shows. When the management committee decided, during a meeting, to subcontract Barry to implement the online questionnaire, and to divide the costs equally between the partners, the institutes of both Karin and Sophia (which had the lowest budgets) refused. This created a heated debate in the management list, as Mario insisted that the management committee should retain its authority, and keep to its decision (since both Karin and Sophia were members). He criticized Karin and Sophia for “opportunistic” behaviour and claimed they had no power to take decisions in the management committee. In the end, Karin and Sophia did not contribute to the subcontracting costs.

The work package leader had the responsibility for substantive issues. Most often, the WP leaders functioned in a discursive way: during meetings, they would propose to the team (in a rather formal way) the task allocation and the content of each work package, and that would be discussed and often agreed by the rest of the team. The authority of the WP leader on substantive issues was generally not contested. Finally, the local authorities had an uncontested power over some issues. The incident described above about Barry’s subcontracting is one example of how they influenced decision-making processes of the team. In general, the local authorities had an influence over the course of the project that was not reflected in the team’s contract.

Because of the multiplicity of authority levels, the individual style of leadership (e.g. of Mario or of the respective WP leader) does not seem to have influenced the decision-making process in the DELTA team. Neither did the status differences between the members, (researchers vs. coordinators) especially in the case of Sophia, Irene and Karin, who were the representatives of their groups, and WP leaders (Sophia and Irene). The rest of the researchers, however, did not participate in managerial decisions. Therefore, the style of decision-making processes in the DELTA team was based on pluralistic leadership: with multiple levels of authority, which balanced each other, and the researchers who participated only in substantive discussions. It is also worth noting that argumentation of the various suggestions was generally expected and that the members were highly reflexive about how the decision-making process was evolving.

Another characteristic of the decision-making process in the team was that it was quite formalised. In the contract the team had specified: “The decision-making processes of the Project Management Committee meetings will be based on a democratic mechanism. … However, if the unanimity cannot be achieved, motions will be evaluated and approved through a majority voting scheme [2/3], and each Contractor has one vote.” Scientific problems would be solved by majority rules, whereas changes in the internal division of labour, in WP leadership, or fund-related problems would be solved by unanimity. These rules were actually enacted and evoked throughout the project. In some ways, “deep discussion” became the focus of decision making in the DELTA team, which persisted in the mentality of the team, whether the issue was budget reallocation or the colours for the team’s logo, and the timing of common dinners.
But did the use of ICTs result in more participatory decision-making processes? When decisions were discussed in the general meetings or the general list, it did not lead to the participation of all members. However, there were more members participating than in decisions through the managerial list or management meetings. Therefore, it was not a different participation that resulted from the use of ICTs, or face-to-face meetings. Rather it resulted from the visibility/public-ness of the medium used. Thus, the more public the medium, the more open and participatory a decision-making process. It is also indicative that in discussions through the general list “the team” or “all” are evoked, as a justification of the decision suggested. Therefore, the public-ness of the medium also influenced the argumentation and justification of decision-making process. This is also indicated by the higher participation of researchers in the general list and the balance in the initiation of communication.

For managerial issues, the power was balanced between the management committee, the local authorities, and Mario: Mario’s role there was quite strong, since he would generally be the one initiating the communication and attempting to impose his opinion. He did not dominate the processes, however, especially because there were multiple authority levels operating in the team. The influence of the local authorities was generally uncontested, and in this sense this level of authority had the most power. The results of the quantitative analysis above also indicate the balance of powers during decision-making processes for general and managerial issues, since researchers dominated the general list, but not the managerial list.

However, the definition of an issue as managerial or general was not straightforward. Often issues moved from the general list to the managerial, when they became sensitive or potentially heated. Other times, issues moved from the managerial to the general list, and also from the two lists to the meetings and vice versa. Usually, this occurred when there was no consensus on an issue, and the transfer of an issue to another medium was a strategic choice of some individuals. Therefore, the issue itself was not the variable influencing the medium through which the decision-making would take place. It was rather the members’ definition of the issues (related to their strategic interests), which influenced which medium they used to raise the issues, and therefore how a decision would be taken.

A last issue to be addressed here is the influence of ICTs on the pace of working processes (chapter 3). Nentwich (2003) and Finholt (2003) both suggest that the use of ICTs in collaborative research would increase the pace of working processes in the team. In contrast, DELTA members were often explicit about decisions through the lists taking too long. However, the duration of the decision-making processes depended solely on the existence of consensus. Indeed, there were decisions that were taken after the exchange of few emails, in which all agreed; and other issues were discussed in meetings and through the lists for months. Therefore, in the DELTA team, the use of ICTs did not affect the pace of decision-making processes, which depended on the consensus of the team, and the urgency of the issue.
B. Conflicts

The review in chapter 2 identified a number of potential tension sources for the DELTA team. As FP5 collaboration, it is expected to be prone to conflicts between research and management, given the existence of scientific leaders, and external evaluation processes; and conflicts between teams, given its relative small size. Tensions are also expected to arise from different disciplinary backgrounds. As possible sources of conflict the following were identified: communication of results and credit, resources, control over the collaborative process. The decision-making process is also expected to influence conflicts.

As indicated in the introduction, the disciplinary backgrounds of the team members were not very different, and indeed tensions due to these differences did not arise in the team. Communication of results and credit was not a source of tension in the DELTA team, probably because they all operated in the social sciences (see chapter 2, section over conflicts). In contrast, the decision-making process, with its multiple levels of hierarchy did result in tensions: over control of the collaborative process, and control of resources. Even though the decision-making process was overall participatory, the multiplicity of authority levels led to tensions in the team, at various stages of the research process. It is indicative that there was a conflict between team members in the early stage of the finalization of the contract (Rasters, 2004), as well as in the end of the project between Mario and group 4, over control of substantive work. The stage of the project did not influence the emergence of tensions to any great extent.

In addition, the use of ICTs, emphasised in chapter 3, is not expected to spark disagreements in the team, given the members’ awareness of technology effects. Face-to-face meetings and a shared team identity would alleviate tensions and would help the resolution of conflicts. Moreover, the following questions need investigation: How do conflicts emerge and get resolved in the team? How do differences among media influence tensions and conflicts in the research teams?

There were tensions during the project, which were perceived by the members as relating to the use of ICTs. For instance, there was a misunderstanding between Yiannis and Markham as to whether members of group 8 were registered in the general list or not. Group 2 had not registered members of group 8 in the list and Markham suggested that this resulted in delays in work. Yiannis’ reaction to the managerial list was “If I was not familiar with the fact that e-mail is biased to create false misunderstandings, I could even go as far as to interpret you as personally attacking me”. However, the issue involved here, as in other cases was not the use of technology as such, rather a miscommunication problem. In a way, their recognition of technology effects made the members more prone to conceptualize some problem as technology-related, but it did not help solve conflict situations, because they were not created by the use of email.

Another aspect of technology use that caused some problems was the expectation of continuous communication. Because the general list was technically available 24/7 some members had the expectation that the flow of communication would also be continuous.
This caused disappointment among some members (Yiannis, Karin) communicated to the whole team; it did not, however, lead to tensions or conflicts. Overall, the use of email as such did not cause conflicts in the team.

Most of the team-wide conflicts in the DELTA team were about the distribution of resources and tasks, and control over the collaborative process. Another source of tension was the relationship of the team with the project officer. More than once Mario raised his voice (virtually and physically) in his attempt to control all communication with the project officer. At the same time, he also made a point that the project officer was their “client” and should be treated like that. This was not something that Sophia or Markham or other members were ready to accept. Finally, a third source of tensions in the team was the personal eruptive behaviour of some members: instances of negative tones and shouting/flaming. These cases however, never resulted in a team-wide conflict. They rather indicated personal negative behaviour expressed publicly. In this way “edgy” emails (virtual shouting) and abrupt behaviour in the meetings did not create conflicts in the team but a negative atmosphere.

In short, the increased use of ICTs in the DELTA team did not create conflicts or misunderstandings. It did create expectations of communication, which in turn resulted in disappointment of some members. It also helped the negative expression and shouting of some members, who were also behaving in this way in face-to-face meetings. The use of different media however, did play a role in how public a conflict would become, who would get involved and how the issue would be resolved. In this way, the use of ICTs did not create conflicts in the team, but it did affect the balance of power in conflicts, the translation of the issues, as well as the conflict-resolution mechanisms. An example of this is the way two similar conflicts were resolved.

In the summer months of 2001 Yiannis had a conflict with Maria, the researcher of his group, which resulted in a conflict with the research institute where he belonged. This conflict was communicated to the team by Yiannis in the meeting, where he asked the team to accept the transfer of the project to the university he belonged, and change his affiliation with his local group. The issue was discussed in the managerial list, where Yiannis sent a formal letter explaining the situation, translating the issue at hand as a communication problem (Maria and he could not meet regularly) and as a supervision/authority problem. This, then, he translated as a managerial problem for the whole team to solve by agreeing to the transfer of the project.

In the discussion that followed in the managerial list everyone accepted this translation of the problem as a managerial issue, and agreed to the solution given. Karin was the only one who pointed to the issue being a supervision (authority) conflict in the first place, as she suggested that Maria should have some say in this, since she had been working for the project. This was immediately rejected by Markham and Mario, who re-defined the issue in terms of a managerial problem. The conflict was in this way presented only by one side (Yiannis), the team accepted his translation of the conflict and they agreed with the proposed solution. The conflict took place in a personal communication space, and it was afterwards communicated both face-to-face and in the managerial list by Yiannis.
Following this, Irene started working for group 2, and in week 78 there was a tension between her and Yiannis. She communicated the tension to the team, with one email to the general list, and with multi-addressed emails (to many recipients): Mario, Markham, Harm, Sophia Franco, Yiannis. In these emails she translated the conflict as a substantive problem, relating to the content of her work, as well as a supervision problem of how Yiannis behaved towards her. This email was followed by many emails from Yiannis as well as the other recipients of the multi-addressed email. So the conflict played out in a semi-public space for the team, which involved most of the members of the management committee.

The translation process continued throughout several emails, with Yiannis re-conceptualising the issue as an authority problem: “However the most essential point is: Am I or am I not the person from [country2] responsible to the project?” However, the semi-public space that the conflict played out meant that other members took part, and translated the issue in different ways. Here again, the intertwined levels of authority can be traced: Yiannis tried to maintain his authority as the local scientific coordinator. Markham asserted his authority as a WP leader, translating the issue as one of continuity of work, and suggested that Irene should stay in the team. Mario also voiced his authority as the project manager requesting that work be continued. This process lasted two weeks, at the end of which Irene continued working for group 2.

The similarities between the two conflicts are strong: both started as conflicts between two individual members, from the same local group, and seemed to be related to supervision problems. However, one was “played out” in a personal communication space, and as a result the team accepted Yiannis’ translation of the problem as well as his proposed conflict-resolution mechanism. The second took place in a semi-public space, and thus involved more members in the team. The issue was translated in various ways by the different actors involved, and this meant that the conflict resolution was a negotiated process, and was not imposed by only one member. The semi-public communication space also made the main contesters, Irene and Yiannis, more aware of their phrasing and tone. In this way, the use of the multi-addressed emails created a different conflict (one that could be more easily translated by other participants) and thus a different conflict-resolution mechanism (different alternatives that resulted from different translations available).

So, again in this example, the different conflict resolution mechanisms were not related to the distinction between face-to-face and ICTs, but between public and private media. The use of private media for the “acting out” of a conflict resulted in a one-way translation of the issue at stake. Since it is always the case that in a conflict one side has more power (authoritative, symbolic, communication, resource etc), the translation imposed would come from the powerful side, and the resolution mechanism would result from this translation. The more public the conflict, the more people involved, and the more potential translations and solutions. At the same time, the power balance becomes more complex as more members get involved. But how would it result if it took place in a
meeting, instead of the emailing list? The description of the first conflict between the groups for the allocation of resources is indicative of this process (Rasters, 2004).

The finalization of the proposal involved a reduction in the original resources for the project by half a million Euros (according to the suggestions of the project officer). Mario sent two proposals for a new allocation of resources to the emailing list: the two proposals favoured group 1, 2, and 3 over the rest of the partners. This sparked disagreement among the partners, with the expression of negative tones through the general list. The issue was transferred to a meeting, the following week, during which a heated debate between the partners started, with shouting, and strong positions between the partners. Jan suggested an alternative proposal, with a more balanced distribution of resources between the partners: the team voted, and Jan’s proposal, with the support of groups 4, 5, 6 and 7 won.

This issue was played out in two public spaces: the general list and a meeting. In both communication spaces negativity and tensions were expressed: through the list the tone was more controlled and formal, whereas in the meeting shouting and more heated discussions prevailed. This could be a result of the participants’ awareness of technology effects, or the fact that during the meeting a final decision had to be taken. However, in both spaces, the decision-making process resulted in a conflict, and in this sense there was not much difference between the face-to-face meeting and the use of the general list.
C. Socializing

In chapter 2 I identified a number of variables that are expected to influence socializing activities in research collaboration: prior relations between the members, common elements, such as nationality, and the degree of interdependence in work. Indeed, personal relations in DELTA were based on prior relations as well as nationality, but not all of them. In chapter 3, some questions emerged about the role of different media for socializing. Do ICTs really “do away with pleasantries”? Does socializing evolve through ICTs in the long term?

Apart from personal communication between the members, the DELTA team used two team-wide media to socialize: the common meetings and the general emailing list. During the meetings there was always at least once a common dinner with all the members, during which pleasantries were exchanged, jokes were made and personal conversations evolved. This was the case even if there was a conflict two hours before. There were also smaller cliques in the team, whose boundaries were often defined in nationality terms, or by prior relations, as expected: groups 1 and 3 tended to sit next to each other in dinners and very often would use their native language; Markham was always close with James and Jeremy; Karin was close to Harm; However, cliques also cut across nationality and prior relations (Karin and Yiannis; Irene and Harm).

Even though meetings were not very frequent, they were important for the creation of a sense of common identity; this was evident in the case of Irene, who started working for the project but met the team ten months after that. Mario, James and Franco all pointed out how important her presence was in the general meeting. Meetings gave the members of the team the opportunity to learn each other better, which was important for creating a sense of “team”. This was most obvious in the case of the review meetings, where the team had to present itself as a whole (not each local group its own work) and defend its progress to the reviewers and the project officer. In this sense, meetings helped create a sense of shared team identity.

Apart from meetings, however, the general list was also used for the exchange of personal information, jokes, wishes, and emotional support. In this sense, email did not “do away with pleasantries” in the DELTA team. Some emails also attempted to create a feeling of “the team”: the members referred to each other as “DELTAers” and “the team” was evoked often. Phrases such as: “the spirit of DELTA” (Karin, week 2), “Dear Friends, after the fights of the last days... nothing can divide us!” (Franco, week 3), circulated in the list attempting to create a shared feeling.

The general list was also used for rewarding and praising each other’s work. It was the only mechanism for appraisal, as this did not happen often in the meetings. When a finished text was circulated to the list, as was the case for example with the literature review by Jeremy, a lot of members replied congratulating him for the work. This was the same for the logo of the team, when it was circulated by the group 3; also when Sophia managed to get access in the organization to be studied in her country. This reward
mechanism was an important part of the working relations, which was not performed through any other medium. At the same time, most team members were also very conscious of pleasantries, and thanked each other when, for instance, they would exchange documents needed. So, the general list was used by the DELTA team as a mechanism for socialising and the creation and maintenance of a team identity.

Even though socializing emails, as well as socializing activities in the meetings, were part of all members’ interactions, the next step is to identify whether some members were more prone to this type of communication than others. In other words, is the use of socializing emails related to the status of the authors? Or is it a purely idiosyncratic characteristic?

All emails in the general list were coded as to whether they had a socializing purpose or not and cross-tabulation with the status of the authors and time was performed. The results showed that socializing emails were related to the status of the authors in a statistically significant way: about 27% of the emails sent by researchers had a socializing purpose over about 15% of the emails of the scientific coordinators49. So, socializing in the general list was not idiosyncratic, but rather a central characteristic. It could be the case that researchers felt more the need to send these types of emails because of their relationship to the project. They were in most cases working full-time for this project, whereas the coordinators were also responsible for other projects, having teaching or other research obligations. In this respect, the stronger engagement of the researchers with the work and the project, could have led to their stronger identification with the team. So, socializing emails can be understood as an indicator of (and a result of) a feeling of shared identity.

As a next step, the time dimension of the socializing emails was studied. The literature suggests that socializing through ICTs takes time to evolve, and this was tested with the emails from the general list. The following figure (Figure 10) clearly shows a positive linear trend over time50: the percentage of socializing emails sent to the list increases as the time goes by51.

This increase in time could be related to the use of the communication technology itself. It is suggested that groups need time to adjust to ICTs as well as to coalesce as a group and depending on the task they often do it well (Walther, 2002). However, it could also be the case that socialising as such needs time, no matter what the communication medium. Even though it is difficult to measure the degree of socialising in the team’s

49 Phi = -0.122 Approx. Sig. = 0.000
50 The graph indicates the percent of emails with a socialising purpose over time in months. The bold line indicates the moving average trend (period 2) and the dotted line indicates the linear trend. The percentages were also inserted in an SPSS file and an OLS regression model was fit (Sig. = 0.000, Beta = 0.536, Adjusted R Sq. = 0.269).
51 The number of socialising emails per month also show a statistically significant positive linear trend over time (Sig 0.010, Beta = 0.404 Adjusted R Sq. 0.141)
meetings, and compare early with later meetings, the observation of the last four meetings does give support to the argument that socialising takes time in general.

![Emails with socialising purpose (%)](image)

**Figure 10: Emails in the general list with a socialising purpose over time**

But did the meetings boost the amount of socialising activity in the list, as suggested by literature in the third theoretical chapter? If this was the case we would see in the figure above most of the meetings corresponding to a peak in the socialising activity the same month. If the meeting took place in the middle or the end of the month this could result in an increased socialising activity the month after. From the nine meetings, only four corresponded to a peak in the socialising activity in the list. This indicates that the meetings may have enhanced a sense of identity in the team as such, but the socializing activity of the general emailing list had a dynamic independent from meetings.
D. Coordination and task allocation

According to chapter 2 a number of variables are expected to influence coordination and task allocation in the DELTA team: the type of intended output, the distribution of skills and expertise in the team, the status differences between the members, the stage of the project. In section A of chapter 5 it was shown that the intended output was the same study in all four countries involved, and that the distribution of skills and expertise was varied in the team, but not very much. Accordingly, the initial allocation of responsibilities among the groups was expected to lead to unspecialised task allocation, and an integrative type of collaboration (Hara et al., 2003): with a need to work close to one another to develop shared ideas over the project, and therefore high degree of interdependence.

In cases of high degree of interdependence, we would expect the coordination of work to be performed mainly through face-to-face meetings, and we would expect formalised communication procedures to succeed (chapter 3). Indeed, both of the expectations were confirmed in DELTA. Coordination of work and task allocation usually took place in the meetings (it was perhaps the main function of the meetings52). The task allocation tended to have a certain level of formality. Generally, the procedure was the following: the WP leader would present the tasks in his/her WP, divide the work in subtasks, and suggest a subgroup for carrying out these subtasks.

DELTA functioned through these subgroups, and their logic was in some cases the different expertise (e.g. for finalising the research tools), and in other cases one member from each country (e.g. for contacting the organisations under study). In this sense, the distribution of expertise did influence task allocation in the team. General guidelines for the subgroups were also outlined by the WP leader, and discussed by the team, together with a set of deadlines. In most cases, a leader of the subgroup was also appointed by the team, usually determined on the basis of her role in the work package, scientific status, or expertise. What followed the proposal of the WP leader always entailed a managerial aspect: the local coordinators or representatives would check the remaining person-months they had for that WP, and sometimes a negotiation would start of who would do what. After this, the members of the subgroup and its leader, the tasks and guidelines, and the deadlines would be recorded in the minutes of the meeting, by the WP leader, and uploaded on the blackboard (and sent to the general list) the following weeks.

The process had a rather formal character, since all elements of the subgroups, guidelines for the work and deadlines were recorded. Moreover, the process of negotiating task allocation on the basis of the remaining person-months was also formal, and followed the contractual agreements of each group. Also, the communication was formalised: the PowerPoint presentation of the WP leader, the recording in the minutes, the uploading on

52 For instance, during the second meeting eleven decisions out of the twenty-four recorded in the minutes related to the creation of new subgroups, their responsibilities and their deadlines.
the blackboard. In general, the division of work in subgroups was quite successful in the DELTA team: most subgroups were functional, they delivered the work close to the given deadline, and collaboration was rather unproblematic. Indeed, the formalisation of communication procedures was high, and it did result in a relative success of highly-interdependent tasks.

However, this was not the only mechanism through which task allocation functioned in DELTA. The second one was the uncoupling of interdependencies. The data analysis is a good example of this process: all seven groups were involved in analysing the data from the same company, which was a highly-interdependent task. However, the task allocation involved breaking down the data in three datasets: survey data, interview data and documents (archival research). Moreover, it was broken down in four topics of interest, which in turn were broken down in key issues, which were broken down in research questions. Two people were assigned one research question, according to their expertise: one conducting and reporting the quantitative analysis (survey data) and the other the qualitative analysis (interviews and documents). One of them would then write a paragraph summarising both results. Each key issue was again assigned to one person, who would write the summary of the analyses for the research questions of each key issue. The reports of the analyses and the key issue reports had a very specific format, proposed by the WP leader and accepted by the team.

This task allocation resulted in the final analysis deliverable, more than 500 pages long, which was in essence a copy-paste of individual work performed locally. In this way, the tightly-coupled task was transformed in a loosely-coupled task, where the only dependence was to wait for the member who would perform the other half of the analysis, or the following research question. Therefore, the DELTA team used two mechanisms for performing tightly-coupled work: one was the formalisation of communication procedures, as expected; and the other was the breaking down of work in loosely-coupled tasks. In fact, most deliverables of the team were a copy-paste of individual reports by the local groups, and very little output was integrative, as will be shown in the next section.

But meetings were not the only medium through which task allocation and coordination took place. The general list was also used for task allocation, as indicated already in the previous chapter (section B). Task allocation and coordination through the general list, were more informal and spontaneous: members volunteered to do additional work when a subgroup was lagging behind; subgroups emerged out of the research interests of some members or from the course of work. Never in these cases were the remaining person-months consulted, nor were the new subgroups recorded anywhere formally, until the following meeting.

So, to return to one of the questions that remained unanswered in chapter 3: How do differences among media influence task allocation processes? In the DELTA team task allocation through face-to-face meetings had a more formal character than task allocation through the general emailing list. In the meetings, the delineation of the groups, their guidelines and their deadlines were formalized and recorded in the minutes. However, throughout work, and because of changes in the work, or the members’ roles, re-
allocation had to take place, which was performed through the general list and had a more informal character.

Finally, the last issue addressed in this section is whether the use of ICTs (Nentwich, 2003), and especially shared databases (Gläser, 2003) change the allocation of work between collaborators, and bring communalization of research at an earlier stage. In the case of DELTA, the use of the shared database did not bring communalisation of research, since the common work was indeed divided by splitting this database (to qualitative and quantitative analysis; and to specific research questions). The general list was used for a more informal task allocation, than meetings, but it did not change the nature of task allocation and coordination. The informal character rather resulted from changes in the on-going work, which had to be dealt with through the list. Overall, coordination and task allocation in the DELTA team was not a “radically new practice of scientific work”.

In conclusion, task allocation and coordination in the DELTA team functioned in a rather successful way, and was influenced by the type of intended output, the distribution of skills and expertise in the team, the status differences between the members, and the stage of the project. The type of output, which was the same for all groups involved, produced a highly-interdependent collaboration, which was in turn addressed with formalisation of communication processes, and an uncoupling of task dependencies. The distribution of skills and expertise was relevant for the allocation of tasks in subgroups, together with the geographical distribution. The stage of the project influenced the level of formality of task allocation. In the beginning of a task (as all WPs were sequential), task allocation took place in a meeting, in a formalised way. During the course of that task, changes in the task allocation were accommodated informally through the general list. In this way, although task allocation was different through different media, this difference resulted from the stage of the task and not the type of medium involved.

Finally, status also played a role in task allocation in the DELTA team: there was a task performed only by scientific coordinators (the delineation of the overarching theoretical perspectives by James, Markham, Yiannis and Mario), whereas there were tasks performed only by the researchers in the team (data gathering, and data analysis). Indeed, the domination of the general list by coordinators in the beginning of the project (see section A in this chapter, figure 8) indicates their increased role at that stage. The rest of the tasks (specification of research design, finalisation of research tools, writing reports) were performed by researchers and coordinators alike. In this sense there was a division of labour on the basis of status, but not for all tasks in DELTA.
E. Output production

As noted in chapter 2, part of the output expected from FP5 projects is non-scientific. In this section, I only study the scientific output of the team, which can be distinguished in two categories: internal (for use within the team and its funding agency) and external output (for a wider scientific audience). In general, output production depends on a number of variables, among which social organisation processes, such as decision-making processes, conflicts and tensions, control and leadership style and frequency of communication are important (see chapter 2). In a relatively homogeneous collaboration, such as DELTA (see chapter 5, section A) frequent communication may be associated with lower productivity (Pelz, 1956). At the same time, the existence of external evaluation and the different disciplinary backgrounds in FP5 projects are expected to lead to high productivity.

So, on one hand in the DELTA team there was frequent communication (especially the use of the general list) in a rather homogeneous collaboration, which is expected to be related to lower productivity; on the other hand FP5 regulations are expected to lead to high productivity. Furthermore, the participatory decision-making processes are also expected to influence productivity positively, whereas the frequent tensions are expected to influence productivity negatively.

The scientific output of the DELTA team consisted of 23 conference papers in international scientific conferences, three book chapters and two journal articles. If we consider that the team consisted of eighteen main members working for around three years, one could suggest that the amount of output was not especially high.

Moreover, the review in chapter 3 raised a number of questions: Do differences among media influence the knowledge production process? Does the use of ICTs lead to a more “chewed” end product? The qualitative analysis of media (chapter 5, section B) showed that the following media were used for knowledge production: general list, and its attachments, meetings, blackboard, personal emails. In order to answer these research questions, I traced in time the production of two internal products (deliverable “Research findings” and the questionnaire) and an external output (conference presentation), and analysed how different communication media were used in the process.

During a team meeting, the guidelines for the deliverable were suggested by the WP leader and agreed by the team. The analysis was divided in qualitative and quantitative analysis, and in specific research questions for each key issue, as described in the previous section (on task allocation). After the meeting, the members used the blackboard to download the datasets and worked on their part of the analysis. Personal emails were used for questions, and possible changes of research questions, as well as to send the work to the member responsible for each key issue. The key issue reports were sent via personal emails to Jeremy, or James (WP leaders) and only very few of them were sent

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53 When a conference presentation led to publication in the proceedings book, this was coded twice, as a presentation and as a book chapter.
through the general list. Group 5, in turn, collated all the key issue reports together with the local studies, produced the deliverable, and uploaded it on the blackboard. The text was finished and sent to the project officer.

Even though this deliverable was the result of the effort of many members, it was a copy-paste of separate texts written by individuals locally; comments were given in few cases, and only via personal emails. There was no sharing of knowledge produced, no development of shared ideas over the results, as suggested by Hara et al. (2003). Indeed, a highly-interdependent task was broken down in loosely-coupled tasks and exchanged through personal communication media; thus it resulted in a rather complementary type of output, where each partner was responsible for their own part and there was no need to work close together.

In contrast, an output that resulted from the collaborative endeavour of many members, by co-authorship, was the questionnaire, which was sent back and forth through the general list by Markham and many versions were uploaded on the blackboard. Each version resulted in a series of comments and revisions from other members. Because the questionnaire was exchanged through the public medium, and because all groups would subsequently use it, it became the result of co-authorship: it was available for the members of the team to comment upon and thus became the result of a shared process. It resembled what Nentwich (2003) called a “chewed text”, incorporating the negotiation of comments and revisions from many members. However, this was a rare case, and most internal output followed the communication stages of the deliverable described above.

The next type of output is an external product of the team: a conference presentation by group 2. In that case, a local face-to-face meeting was used for discussing the research, and coordinating the work. The work was also sent to the general list and discussed in the next team meeting, and a number of comments and suggestions from the team were recorded in the minutes. After some time, two new researchers from group 2 started working on it, and advice and guidelines for the coding were exchanged through personal emails. A final face-to-face meeting took place, during which the analysis was conducted and the results were discussed. The report was written by Irene, putting as co-authors the other members of group 2, and it then became the basis of a presentation that she gave in a scientific conference.

Was this work collaborative? At the local group level yes, as it developed through the efforts of different members of group 2. When the work was sent through the general list comments were given by the whole team. In general, though, the process remained a local activity, as was the case with most external scientific products of the DELTA team. In this process, the face-to-face meetings were only used for the organisation of

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This was a rare exception where the production of external output was communicated to the team.

The exception to this were five conference presentations (three by groups 2 and 4; one by group 4 and 5; and one by groups 1 and 8) and one book chapter (by group 4 and 5).
the work and setting of guidelines, and the work and comments on it were exchanged through personal emails. This was similar to the process of internal output production.

So how did differences among communication media influence the process of knowledge production? The exchange of work through the general emailing list facilitated the sharing of comments and feedback, through the development of shared ideas; However, this process was limited to the compilation of the research instruments (the questionnaire, the interview schedule and the self-survey are the only substantive examples). Most output was a collation of individual contributions, rather than a collaborative activity. The use of personal emails for exchange of work meant that the product was unavailable for comments and feedback and it remained an individual text. Face-to-face meetings were used mainly for the coordination of work, and rarely for sharing ideas or substantive feedback. Finally, the blackboard played a role in the stabilisation of the texts and their acknowledgement as final and formal; but it did not lead to the communalisation of knowledge, because of the process of uncoupling dependencies.

In conclusion, the differences among communication media played a distinct role in the type of output produced: texts sent through the general list often received comments and feedback from other members, which made them a co-authorship product, a “chewed text”. In contrast, texts exchanged through personal emails, did not receive any feedback, and were often a collation of individual contributions, which was the case with most internal and external output. The use of shared online databases did not result in a communalisation of knowledge, because tightly-coupled work was broken down in loosely-coupled tasks. So, task allocation also influenced the type of output produced.

56 An exception of this was the second meeting with sharing ideas on the literature review and the finalization of the key issues.
Summary of results

So, how did differences among media in DELTA influence collaborative working practices? They influenced the participation in and justification of decision-making processes as well as conflict resolutions: meetings and the use of the general list resulted in more open, more participatory decision-making processes, with a justification referring to the whole team, in contrast with decisions through the managerial list, where the coordinator and the management committee dominated. The difference was related to the degree of publicness of the medium involved, as hypothesised in chapter 1. In a similar fashion, conflict resolution was also influenced by the degree of publicness of the medium: the more public the medium, the more members intervened, offering different translations and different resolution mechanisms. This means that in conflicts and in decision-making processes, the degree of publicness of the medium affected the decision which would be taken in the end, or the resolution of the conflict. In this sense, the analysis so far indicates that the influence of media on working processes is related to their degree of publicness. This, in turn, is not related only to the number of recipients of the communication, but also the explicitness of participation, as indicated by Meyrowitz (1985).

The general list and meetings were also used for socialising in the team, which resulted in the creation and sustaining of a shared team identity. Even though meetings were important in this respect, socialising through general list had its own dynamic, independent from meetings. This socialising activity through the list was related to the status of the participants (researchers socialising more through the list) and it also increased in time. In this respect, the use of the general list resulted in the maintenance of a socialising and reward mechanism in the team. Differences among media did not influence task allocation in the team, even though there was a more formalized task allocation during meetings, than through the general list. This, as the analysis showed, resulted from the different stages of the project, rather than the influence of media configuration.

Finally, differences among media influenced the type of output produced. The use of the general list and its attachments for output exchange resulted in sharing comments and substantial feedback and the development of a negotiated “team” product. In contrast, the use of personal media promoted the tendency for separating output production among local groups. In this respect, again the publicness of the medium influenced the type of output produced, with more public media resulting in a more “chewed” and negotiated output. With regards to task allocation, the use of the shared databases did not result in a communalisation of knowledge production. Finally, even though the team’s initial task allocation was integrative, with all groups participating in all stages of research, this did not lead to an integrative type of output and the interdependencies between local groups were minimized.

Apart from these results, the analysis in chapter 5 (section C) indicated that the frequency of use of specific media was increased by some working processes under study, in a
relation of mutual dependence. Decisions increased the frequency of the general list, the management list and its attachments. Socialising and output production also increased the use of the general list, while output production also increased the exchange of attachments through the list. Finally, deadlines also increased the use of the general list. The most influential working process seem to be decisions, which increased both lists, while socialising was the activity with the highest degree of influence on the general list, highlighting its important role in the team. The functions that the media supported (see Table 3 chapter 5) remained stable through time. The frequency of media use was distributed evenly through the period of the project (apart from the management list), and there were no sudden changes in the frequency of media, the types of media used, or the functions that media supported. Moreover, the MA models with negative coefficients indicate that random shocks influence the use of media in the short-term only, and their effect was reversed in the following week, with a return to equilibrium. The team managed to produce a rather stable media configuration.

But to what extent are these case-specific results? How can these findings help us understand the dynamics of FP project collaborations and the mutual relationship between media and research collaboration? The second case study will follow the same analysis, and will be based on the insights learnt from the analysis of DELTA.