Reshaping the boundaries of the firm in an era of global interdependence

Communication in networked companies

Ana Moreno Romero[1]

[1] Department of Organization, Statistics and Business Administration, Industrial Engineering School of the Polytechnic University of Madrid. C/ José Gutiérrez Abascal, 2. 28006. Madrid.

ana.moreno.romero@upm.es

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Abstract

Many are the transformation processes being undergone by society as it evolves from an industrial to a networked society. If one had to choose the axis around which all these changes turn, many would say, the author among them, that it is communication. What really changes is the way we communicate with one another, which is something deep down inside human beings that shapes their identity and the identity of the groups they are involved in. Electronic communication is a new world that has its benefits and drawbacks depending on the context. In an environment where enterprise works ever more in networks and in an international context, understanding the role played by communication in group work is vital. This research work examines specific aspects of electronic communication: the loss of non-verbal aspects of communication, the decision making process and the need for networkers to organise face-to-face meetings for important matters.

Keywords: Electronic communication, virtual organization, network, commitment, social identity.

1. Networked organizations

The new context in which professional activity is evolving is the networked society. Organisations are evolving towards models of a networked society (telework, outsourcing, and globalisation). Manuel Castells has conceptualised it as the social system of the information era structured into information and communication technology-based networks

(ICT), as tools for boosting this kind of relationship, which is nothing new (Castells, 1998). This networked society is in the core of the international activities of companies, particularly in those aspects related to organization and groups ways of working.

In this new context professionals move through this knowledge society with completely different frameworks from the well-known ones in the "wage-earning model": more responsibility for developing their career, the need for continuous learning, the need to manage numerous changes of company or position and seeking to enhance their employability. Overall, human relations in an organisational context are being confronted by new frameworks of communication and relations that can have a high impact on the way business and human resources are managed.

The work tool that is spearheading these changes is called ICT. It is a complex tool that follow a continuous cycle of novelty, a knowledge barrier to its use, assimilation by the user and then consolidation of the change…. if there is any. A certain time has to pass before we know if we are witnessing a real change in the way work and relations are organised or if we are witnessing a transition process of adaptation to a new tool.

Organisations in the industrial age are characterised by concrete work centres where a space, a timetable and a culture are shared. The organisation's commitment is fulfilled by socialisation processes adapted to this framework. Networked work models both inside and among organisations, could lead to a weakening of the pillars of organisational cohesion: culture, time and space. The need for affiliation, understood as an individual's desire to have a social life and belong to a group relates positively to a strong organisational social identity, which means that this effect of diminishing commitment and confidence would be seen in individuals having this natural need for affiliation, since during the changes towards virtual models they may feel they are losing contact with the organisation (Wiesenfeld, Raghuram,

and Garud, 1998). Moreover, organisational identity makes organisational behaviour possible: without shared identity there can be no shared communication, no exchange of knowledge, no meaningful planning or leadership.

Telework has been the concept that has brought together the first experiences of spatial and time relocation with a 30 year history of experiences that can be evaluated, particularly for the profile of large firms. Extrapolation to other kinds of organisations like Public Administrations, small to medium size companies or NGOs is not automatic, although all organisations appear to evolve into the network nodes of a digital nerve fibre network (Gates, 1999), which establishes new network layouts for inter-organisational relations. The conclusions drawn from these years of study let us see a trend towards these initial forms of organisational virtualisation which need to be understood as part of a phenomenon that affects the organisation as a whole (Bailey and Kurlam, 2002).

One of the keys to managing organisations is understanding the role of the human groups comprising it and being able to analyse the psychological processes that generate a sense of being part of a group and building the social identity of an organisation. If we are to look more deeply into the changes introduced by the new ways of communicating and the ensuing impact on organisations, we need to concentrate on group behaviour.

Seen from this perspective there is a particularly relevant impact for organisations: the change in communication channels which may have profound consequences on the way groups behave (Hollingshead, 2001). The next section looks more deeply at communication in networked organisations.

Classic group behaviour is undergoing changes due to the new forms of networked organisations. Many groups in their organisational framework now have an important part of

their interaction in virtual environments. In these cases communication by electronic means may be the cohesive bond that replaces the traditional culture and the coincidence in time and space. This idea, which goes one step beyond assuming that communication changes modify group behaviour while adding that it is the variable that should be monitored in order to ensure group cohesion, was studied by Wiesenfeld, Raghuram and Garud (1998), *"Communication can strengthen the identification of the members of an organisation because it affords them the opportunity to create and compare their subjective perceptions of the organisation's rules, values and cultures… Communication helps create shared meaning because it offers social keys, which attracts the presence of what is social and creates a context of shared interpretation"*.

2. Communication in networked groups

When professionals "go virtual", they use different communication channels that recover social contexts in different ways. Means such as face-to-face communication, sharing written documents, the telephone or email can be, and generally continue to be used but differ in synchrony, formality, the interpretation of the shared context and the social keys transmitted. For example, it could be said that the intensity and meaning of a face-to-face meeting with the boss can be evaluated differently by a worker that is in the office every day and sees the boss on a daily basis than by a teleworker who goes to the office twice a week and only sees the boss at a planned weekly meeting.

This section examines some of the changes brought about in communication when different electronic channels are integrated, their impact on group behaviour and particularly on forming ties.

There is no doubt as to the benefits brought by ICT to interpersonal communications. The opportunities opened up by email, the mobile phone, virtual group work tools and instant messaging are now part of millions of people's working and personal life. The impact on increased productivity is widely acknowledged, but more important are the opportunities for innovation associated with these new channels of communication.

How are the emotional and non-verbal aspects of communication transformed when communication occurs through the different electronic channels? Are the power frameworks and decision-making processes changed when the major part of the communication is not face-to-face? How do these new communication, decision-making and trust-establishing frameworks affect the way groups perform?

If we look back at traditional communication frameworks we can see the importance of communication on group behaviour: "*Over 60% of administration problems in organisations are the result of bad communication*" (Peter Drucker, 1989). The traditional problems of communication in organisations according to Charles Handy (1988), are:

- Distortion on the part of the transmitter who does not reveal part of the information because they feel that by doing so it is to their advantage.
- Lack of trust, which leads to workers refraining from giving useful opinions.
- Distortion on the part of the receiver, who filters according to their own mind map.
- Distance: a study shows that a 3 step jump between two groups that communicate means a 30% loss of the message. What is the 70% percent that arrives and what is lost?
- Lack of clarity, a particularly relevant issue if we consider that what is clear for one person because of its conciseness may be insufficient for another.

Do these distortions change when communication is complemented by electronic means?

Analyses tend to compare new scenarios with traditional tried-and-tested scenarios, which at present are what ensure the running of organisations. It would seem that trust is still basically built with face-to-face communication and that decision-making processes, and in the last instance power management, are still guided by the rules governing face-to-face relationships. However, new definitions need to be sought. What is a group in a networked society? What is the basis of communication and what is complementary between what is virtual and face-to-face? How are the shared learning processes modified which let a group function as such? What tools play what role?

One possible viewpoint for approaching this issue is Hollingshead's (2001), who classifies the technologies supporting group communication according to figure 1:

Insert figure I about here, please

This framework sets out four blocks of tools that act on group behaviour:

- Technologies that provide or change communication within groups and which have enabled interactions to go from face-to-face frameworks to practically 100% virtual frameworks in a varying but significant proportion. In addition, the use of these technologies allows a different management of synchrony/asynchrony in communication. These technologies are landline and mobile phones, videoconferences, chat, email, voice over IP communication….
- Technologies that provide the necessary information for groups to function, such as data bases, expert systems, intranets, e-learning platforms… The component parts that might be widely designated as a knowledge management system are incorporated as one of the cornerstones of group functioning.
- Communication with external support, which are the same technologies, but instead of being used as part of the groups own resources are used in their capacity to connect with

the outside world. This obviously contributes a whole range of additional resources but at the same time complicates management and decision making.

- Support tools for processes to enhance group work performance. These may affect both internal processes and externally-related processes. They may be the key for structuring processes with an eye to operational simplicity, but at the present time placing openings, creativity and flexibility at the service of the user carries more weight than the need for simplification.

It is currently complicated to predict what the major changes in communication will be. The uses made of ICT by young people are just some of the signs that make us realise that we are still far from understanding the changes. What are missed calls? Why has instant messaging become the new means of cohesion among young people? How are their everyday lives affected by being permanently connected to a single device, the computer, where homework, music, Messenger and their basketball results all come together?

Research by technology companies like Microsoft, speaks of sensitive machines, such as mobiles that know where their owner is and detect their state of mind: *"They should have the capability to transmit emotions, which are a major component of our intelligence"* (Oliver, 2006)

Four main sources of change can be pointed to in interpersonal relationships in electronic communication contexts (McKenna and Bargh, 2000): a greater degree of anonymity, a change in the importance of physical appearance, a reduction in the importance of distances and a greater control over time and the course of interactions. The following sections will look more closely at each of these aspects:

A greater degree of anonymity:

Some of the underlying psychosocial processes that must be borne in mind when analysing and understanding the outcomes are as follows: deindividuation, a variation in the role or a break with stereotypes:

A change in the importance of physical appearance: A lot of research shows that physical appearance plays a determining role at the start of relationships. This does not happen with the Internet and a large number of electronic communication channels (email, forums, chats) which means physical appearance does not hinder any possible relationship.

However, this reality gradually changes as the electronic communication channels change. Currently, videophones or web 2.0 phenomena like Youtube, Facebook or Tuenti, are carrying users to the other extreme: from privacy to hyper-exposure.

A large reduction in the importance of distances: This reality opens up a whole range of opportunities for widening our circle of relationships, a particularly significant fact when persons with very specific common interests are sought (collectors, specialists,..).

The opposite side of this reflection reveals the paradox that most Internet communication is among persons who are most physically close. Being a logical consequence of a highly intense relationship, this leads us to think that it could represent a substitution for desired face-to-face encounters. Data, however, does not bear this out. The presence of the Internet permits a proliferation of weak ties and the keeping of strong ties with distant persons. It appears that the Internet leads people to build social networks with new frameworks of behaviour (Boase et al., 2006)

A greater control over time and the course of interactions: On the one hand asynchrony helps control the course of a conversation, avoid interruptions, and enables more detail to be entered into than in a direct conversation. On the other hand, there is a loss of spontaneity and conversations are fragmented when email is used.

For many networked professionals, like those in the preceding example, there is a continuum that follows the following framework: face-to-face encounter, IP phone (Skype), instant messaging (Messenger), email and SMS. It is as if there was a continuous conversation with synchronous and asynchronous sections depending on circumstances. Meetings are just one more element in the chain for dealing with particularly difficult issues. Moreover, the moment can arrive when the main objective of meetings will be to have an encounter.

However, the undeniable ease in setting up communications may become a problem. The saying “always on” is beginning to lead to conflicts of time administration, and therefore, stress. Electronic life is very demanding and technological benefits are highly useful while one is capable of deciding what they are to be used for.

Linked to these changes, it has been seen that there are both threats and opportunities on the horizon concerning group behaviour. The same circumstances, that for one group are a threat, are seen as an opportunity by another group. For example, what for the principal employer may be an inconvenience linked to the dispersion and fragmentation of communication, for a civil organisation may be an opportunity to win over a sympathiser’s time and attention. Information and communication technologies and the Internet have transformed groups, both at work and among citizens in general. Members do not need to be present to share information, cooperate or mix. The number of support groups in the Internet is growing, brought together by common goals and which enable the participation of people who would otherwise find it difficult, such as those who live in isolated areas, are ill or prefer anonymity.

Networked communication is not very conceptualised. What management models are we using for the different channels: email, forums, videoconferences, mobile phone, and instant messaging? We have a whole lot of new channels that we tend to use with the same

frameworks as we used to use face-to-face and with the telephone. However, these channels require new skills.

Changes in the ways we communicate brought about by technology have psychosocial effects on groups. There is already some research that enables them to be partially characterised. Hollingshead (2001) analyses the following:

- **Verbal communication and paralinguistics is very important, especially if there is prior cognition**. The members of a group learn to interpret gesture, tone of voice, and postures with the experiences shared over time. Therefore, persons in close contact trust in non-verbal communication and paralinguistics to collect, communicate and evaluate information from strangers, which means they perceive themselves to be negatively affected when these elements of communication are lacking. Hollingshead (2001) has proved this empirically in two experiments.

  Following the same line of analysis it can be said that social norms are not communicated electronically with the same force as in face-to-face frameworks, which means the ability for social influence is diluted. As pointed out by Spears and Lea (1994):

  - A real cognition of the persons who relate to one another in a group takes longer to become consolidated, which makes it more difficult to establish personal relationships.
  - Electronic communication diminishes everyday trust and contact and promotes antisocial attitudes.

  An underlying conclusion of many theories is that electronic communication diminishes emotional exchange. In line with NLP theories (Neuro-Linguistic Programming), 93% of communication is non-verbal (7% words, 38% intensity, tone, voice quality, speed, timbre…, 55% breathing, eye movement, gesture, posture, body movement, facial

expression…) (Bertolotto, 1995). These data underline the importance of understanding the transformations in communication when using electronic channels.

- **Electronic communication can lead to the suppression of information, with information being richer in face-to-face encounters**. Experiments by Straus and McGrath (1994) with brainstorming and problem-solving tasks, on the one hand, and Hollingshead (2001) in group decision making, on the other hand, show that groups without face-to-face communication perform less well, while the difficulties of consensus are greater.

Moreover, as cited by Lea, M., Spears, R., Rogers, P. (2003), workers who are outside the power frameworks are more easily controlled and monitored.

However, if we refer back to the communication problems stated by Handy (1998) set out at the beginning of this chapter, electronic channels can reproduce and extend the difficulties of information omission through error, either deliberately or through inefficiency. Asynchrony introduces some time for reflection in respect of synchrony that can contribute a greater capacity for manipulation as well as reflection.

- **A difference of status can affect virtual communication the same as face-to-face communication**. Many experiments have shown that people of low status who may feel too inhibited by face-to-face communication to freely contribute, participate more freely in electronic environments. This is what has been denominated the “the equalising effect in participation”. However, another set of studies failed to obtain evidence to this effect, maybe because in electronic communication there are also many ways of transmitting status.

Looked at from another point of view, electronic communication enhances decision making processes because it increases rationality and objectivity while the inefficiencies of face-to-

face communication disappear. The fundamental issues operating are a widening of the audience, the gathering of a broader range of opinions and a greater democracy surrounding decisions.

Power and influence are an aspect that can hinder the progress of effective communication through electronic means if they are not transformed and continue to adhere to traditional models.

- **People quickly adapt to the new channels and any differences may disappear with time**. Experiments by Hollingshead, McGrath and O'Connor show that even the most robust results concerning the changes brought about by technology on communication may not be robust over time. For example, members of groups with electronic communication may feel less connected initially, but with the passage of time may even begin to create closer ties than face-to-face groups.

  Zornoza, Orengo, Gonsalvez and González (2002) analyse the impact of electronic communication compared to face-to-face communication on group behaviour, according to the richness of the channel used and the tasks to be performed. It was proved that *"time issues play an important role in the behaviour shown by members during group interaction and in the outcomes"*.

In the foregoing pages a review of the research of different authors has shown how the changes occurring in communication do not allow the consequences to be predicted with a single voice. In addition, the time cycle of associated research and publications, and the speed of technological change, can give rise to the sensation that reality is progressing way ahead of knowledge.

3. Research and objectives

The objective of this research is to identify to what extent decision making processes in networked work environments are being changed. The introduction of organisations into the new electronic communication channels will probably change some of the psychosocial characteristics of communication. To be precise, it is wished to compare the following premises in line with Hollingshead's theories (2001) which are set out below:

H.1. Networked workers perceive a change in the ways of communicating in organisations due to the use of ICT.

H.2. Networked workers feel the loss of the non-verbal aspects of communication.

H.3 Networked workers do not perceive any change in the decision making process nor is it seen to be less influenced by the status of each person in the organisation.

H.4 Networked workers do not perceive the decision making process to be less influenced by the status of each person in the organisation.

H.5. Networked workers organise face-to-face meetings for important issues.

H.6. Information professionals have little free time and a high level of obligatory interactions which means they have a significant participation in virtual communities under conditions of anonymity.

4. Methodology

The methodology used consisted of a quantitative analysis of a group of 205 professionals. The **sample** was made up of: 42% professionals from the technology sector, 16% from

universities, 14% from NGOs and 28% professionals from various companies or institutions that do not use telework.

The sample was characterised to analyse two different ways: the virtual and non-virtual organisations to which the participants belong and the networked and non-networked professionals.

The **questionnaire** used comprises the following blocks for investigating the hypotheses put forward:

- Biographical data: age, sex, level of education, main organisation worked for, number of organisations worked for and relationship with the organisation (5 items).
- Networked professional's profile with the approach used to explain the definition of a networked professional, which is set out in the section on variables (5 items).
- Virtual/networked organisation profile: data that identify the organisation, which, among other things attempts to establish how close to society the organisation's network is (8 items).
- Communication inside the organisations: this consists of 10 questions scored on a scale of 1 to 5. 1 = total disagreement and 5= total agreement. The questions are stated alongside the results.

The **variables** worked with are extracted directly from the questionnaire and are as follows.

- *Networked profile*

The first step to investigating changes in networking environments requires a definition of what is understood by a professional with a "networked profile", compared to a traditional professional.

For this research, this variable was defined in line with 4 aspects, which are: ICT use, main work outside a traditional office 1 or 2 days a week, organisation type (sector, growth and innovation) and belonging to several groups (professional, civil groups or others).

The first calculation was made by directly asking the participant the question (no.4), and assigning them a network profile to responses 1 and 2:

1.- I am a teleworker.

2.- I am an occasional teleworker.

3.- I used to be a teleworker.

4.- I have never done telework.

With this approach 110 participants defined themselves as teleworkers.

The second parameterisation was constructed with the response to the following questions:

A) Networking:

1) Telework 1 day/week or more for over one year.

2) Telework 1 day/week or more for less than one year.

3) Working outside the office for various reasons for 1 day/week or more.

4) Habitual remote work from home over and above the office timetable.

5) Work in a traditional office.

B) ICT use

1) Nothing or mobile.

2) Email, the Internet, basic office computing, games.

3) Advanced applications, on-line services...

C) Organisation type.

1) Traditional sector with traditional offices.
2) Knowledge sector.
3) Technology or consultancy sector.

D) Participation in different organisations:

1) I do not belong to any organisation other than my work.
2) I occasionally take part in the activities of organisations other than where I work (NGOs, social partners, Master's, university, professional bodies…)
3) I actively participate in these organisations.

Ranking: 0=Non-networked Profile. 1=Networked Profile: If A= 1,2=> 1, If B= 1 => 0, If A+B+C+D>7=> 1

- *Networked organisation (or virtual)*

100% virtual organisations are practically non-existent and probably with the actual rate of ICT progress few organisations are 100% traditional. Notwithstanding, and in the light of the analyses of this research it has been considered useful to work with two categories, virtual and non-virtual. This does not mean that those assigned to the virtual category are 100% virtual, or that those assigned to the non-virtual category are totally non-virtual.

The variable is of our own making and was constructed as the sum of the 3 variables in the questionnaire, in the following way:

- Sector: the response "information society" was taken as 1 compared to the networked organisation variables. The remaining responses, industry, services, social services and cooperation for development were assigned a score of 0.

- Organisation growth: the responses of expanding and under reconversion were assigned a score of 1; those of stable condition, decline or not known/no response were given 0.
- Organisational structure: the response “traditional organisational structure” was given a score of 0; the rest (some people do telework, networked organisational structure, organisation lacking in affixed structure and virtual organisation) were given a score of 1.

A company is deemed to be virtual (1) when it scores 2 or more. ICT sector companies are directly assigned as networked organisations, even though according to the responses of their professionals in 20 cases they would not be such. The total number of participants belonging to networked organisations is 131, of which 81 are from the same sector. Therefore, 64% of participants belonged to virtual organisations.

- *Communication variables*

The first 8 questions of the block of the questionnaire on communication in organisations were taken from the hypotheses put forward by Hollingshead (2001) in her paper entitled “Communication technologies, the Internet and research into groups”. For each of the 3 statements taken from the hypothesis chapter some questions have been formed (3.3 and 2 respectively). The degree of agreement or disagreement with these questions (from 5 to 1) with the responses of the participants is noted. The last two questions were included so as to be able to study participation in virtual communities under anonymity so as to be able to explore some of the theories of the SIDE model in the future.

Reliability analyses of the set of 10 questions, the 8 related to Hollingshead’s hypotheses (2001) and the blocks of 3, 3 and 2 questions associated with the 3 statements give results of less than 0.7. Only when an analysis is made with the part of the sample that reflects the participants with a net profile is an acceptable reliability of 0.69 attained.

Neither does the factorial analysis which contains 4 components that explain 65% of the variance let the scale be debugged in order to attain alphas of 0.7.

5. Results

To set out the results the hypotheses put forward were followed:

H.1. Networked workers perceive a change in the ways of communicating in organisations due to the use of ICT.

The statement dealing with this hypothesis in the questionnaire is:

A. *Information and Communication Technologies are changing the ways of communication in my organisation.*

The mean for this statement is 4.34. It can be seen that the first question is clearly confirmed.

The difference in means depending on the net profile for the first question is not significant and it can be seen that the trend is for net profiles to be more in agreement with the fact that ICT brings about changes.

If the differences in responses are analysed according to whether or not the participants belong to a virtual organisation, the data is as shown in the table below:

Insert table 1 about here, please

It can be seen that the participants of virtual organisations see the impact of ITC on communication more clearly. For each of these sub-samples (VO and non-VO), it can be seen that the difference in perception depending on a net or non-net profile is not significant.

H.2. Networked workers feel the loss of the non-verbal aspects of communication.

The two statements dealing with this hypothesis in the questionnaire are:

B. Electronic means affect effective communication because non-verbal and paralinguistic communication is lost.

C. In electronic communication the amount of information shared compared to face-to-face diminishes.

These questions are aimed towards comparing Hollingshead's hypothesis that verbal and paralinguistic communication is very important, particularly if there is prior cognition.

The means of these questions are 3.9 and 3.19 respectively. It can be seen that the responses are less in agreement with the statement set, and in the case of question C the mean is close to 3 (3.19). The differences between net and non-net profiles are only significant for question B, the score being 3.6 for non-net profiles and 3.24 for net profiles. From this it may be deduced that the fear of losing non-verbal communication is less for those who have the chance to go out of the office.

If the differences in responses are analysed according to whether or not the participants belong to a virtual organisation, the data is as shown in the table:

Insert table 2 about here, please

It can be seen that a comparison of the means according to whether or not a participant belongs to a virtual organisation is not significant.

H.3 Networked workers do not perceive any change in the decision making process nor is it seen to be less influenced by the status of each person in the organisation.

The question dealing with this hypothesis in the questionnaire is:

D. Decision making in the organisation is more objective thanks to electronic communication.

The means for the three questions related to Hollingshead's second statement (2001) are shown in the following graph. The first statement is practically a 3 (3.02), which means it is neither confirmed nor discarded.

The difference of means depending on the net profile for question D is significant as can be seen from the following graph. People with a net profile, in principle the most habitual users of electronic processes do agree that decision-making is more objective with electronic communication. Professionals with non-net profiles do not agree.

Insert graph 1 about here, please

If the differences in responses are analysed according to whether or not the participants belong to a virtual organisation, the data is as shown in the table:

Insert table 3 about here, please

It can be seen that the participants of virtual organisations score more highly. For each of the sub-samples, it can be seen that the difference in perception depending on a net or non-net profile is not significant in virtual organisations but is significant in non-virtual ones where the net profiles are more in agreement with the statement.

H.4 Networked workers do not perceive the decision making process to be less influenced by the status of each person in the organisation.

The two questions dealing with this hypothesis in the questionnaire are:

E. Persons of lower status feel freer when participating in groups with electronic communication than in face-to-face groups.

F. With electronic communication I feel freer to express opinions.

It can be seen that the responses to question E, which deals with the freedom to express an opinion in general, is slightly in agreement with the statement set (3.05), and in the case of question D, which evaluates the same aspect applied to oneself, the mean does not attain a 3 (2.8). The differences between net and non-net profiles are not significant.

If the differences are analysed according to whether or not the participants belong to a virtual organisation, the data is as shown in Table 18:

Insert table 4 about here, please

It can be seen that a comparison of the means according to whether or not the participant belongs to a virtual organisation is not significant for question E but is significant for question F, the score being in each case less than 3. In both cases, the professionals of virtual organisations feel freer to express their opinion in electronic communications.

H.5. Networked workers organise face-to-face encounters for important issues.

The two questions dealing with this hypothesis in the questionnaire are:

G. When I work in groups with electronic communication we organise face-to-face meetings for important decisions.

H. Knowing the people I work with in groups with electronic communication is important for good performance.

The means for these questions are 3.74 and 3.94 respectively.

It can be seen that the responses to communication G and H are positive. The differences between net and non-net profiles are significant for question 7 (G) as can be seen from the graph:

Insert graph 2 about here, please

If the differences are analysed according to whether or not the participants belong to a virtual organisation, the data is as shown in the table:

Insert table 5 about here, please

It can be seen that the comparison of the means according to whether or not a participant belongs to a virtual organisation is not significant for question 8 (H) but is significant for question 7 (G), the difference in this case being that the score is high.

As a supplementary analysis for the communication questions of this hypothesis the correlations between the different communication variables have been calculated:

Insert table 6 about here, please

It can be seen that apart from the expected correlations of the questions in a same block, what is interesting is the possible significance of the positive correlation between questions 5 and 6 on the freedom to express opinions with questions 7 and 8 on the holding of face-to-face

meetings. A negative correlation might have been expected but as this was not the case it can be though that very active network persons complement with presence and not the contrary.

Finally, without going into detailed analyses, it should be pointed out that there are significant differences by gender in questions G and H, on face-to-face support meetings. The scores are higher for men, which links up with traditional ideas when talking about women's career development and indicates that they do less professional "networking" with a negative effect on promotion.

H.6. Information professionals have little free time and a high level of obligatory interactions which means they have a significant participation in virtual communities under conditions of anonymity.

It was attempted to compare these two questions with two control questions:

I. I take part as a receiver in some virtual community (forums, chats, mail lists) anonymously.

J. I take part as a transmitter in some virtual community (forums, chats, mail lists) anonymously.

The number of responses received (YES=3,4,5, No=1,2) contradicts the initial supposition since the number of participants is high, as the following graphs show.

Insert graph 3,4 about here, please

It is interesting to underline that these two questions correlate with the freedom to express opinions.

There are also significant gender differences for these two questions on anonymous participation in virtual communities, with male users being the most active.

6. Conclusions

It can be said that the six statements of the hypothesis that it was wished to compare have been confirmed, although some with scores not much higher than 3. It should be emphasised that changes are more clearly perceived by the participants with net characteristics (VO and net profile) and any possible risks or inconveniences are paradoxically of greater concern to those who are distant from the network than to those who are leading the change.

If we take another look at each of the statements and we link them to characterise the responses of a professional in a virtual organisation, it can be seen that networked professionals (compared to non-networked):

• Consider that ICT is changing the ways of communication (4.44 vs. 4.09).

• Feel that communication is less effective because non-verbal communication is lost (34 vs. 3.36), but they are less concerned than those who are not in virtual organisations that electronic communication contributes less information than a face-to-face meeting (3.07 vs. 3.39)

• Consider that decision making in the organisation is more objective (3.17 vs. 2.75).

• But they do not feel freer to express opinions with electronic communication (2.82 vs. 2.78) and scarcely perceive that people of lower status can express their opinion more freely (3.10 vs. 3.00). It can be seen that colleagues in non-virtual organisations are less in agreement with the fact that freedom is gained.

• They organise meetings for important decisions (4.02 vs. 3.29) and think it is important to know the people with whom they are working with in electronic communication groups in order to achieve good performance (4.02 vs. 3.83).

Finally it is worth pointing out that unlike what was expected, a high level of anonymous participation in virtual groups has been found, both for receivers 52%, and transmitters, 40%.

More research is needed to understand the changes that networked work models are bringing about concerning decision making and power management, since these are two key aspects of group behaviour.

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Figure 1: Group support technologies (prepared according to Hollingshead, 2001)

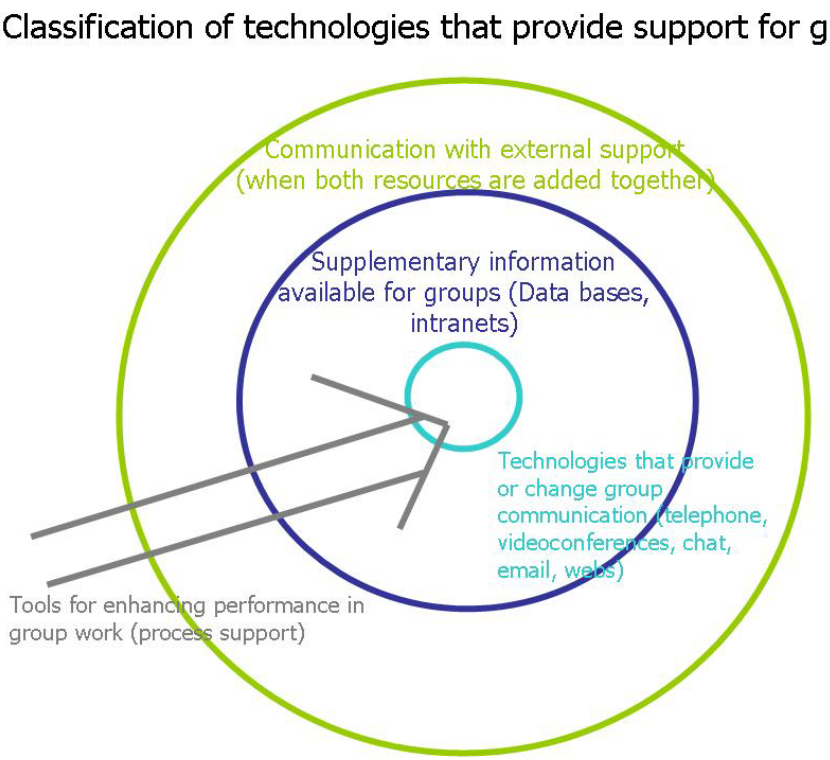


Table 1: Comparison of means for communication question A(1st)

	Total	VO	Non-VO	t test
C1	4.34	4.44	4.09	0.008

Table 2: Comparison of means for communication questions B(2nd) and C(3rd)

	Total	VO	Non-VO	t test
C2	3.39	3.40	3.36	
C3	3.19	3.07	3.39	0.092

Table 3: Comparison of means for communication question D(4th)

	Total	VO	Non-VO	t test
C4	3.02	3.17	2.75	0.004

Difference in means according to profile is significant.

Table 4: Comparison of means for communication questions E(5th) and F(6th)

	Total	VO	Non-VO	F test
C5	3.05	3.10	3.00	
C6	2.8	2.82	2.78	0.017

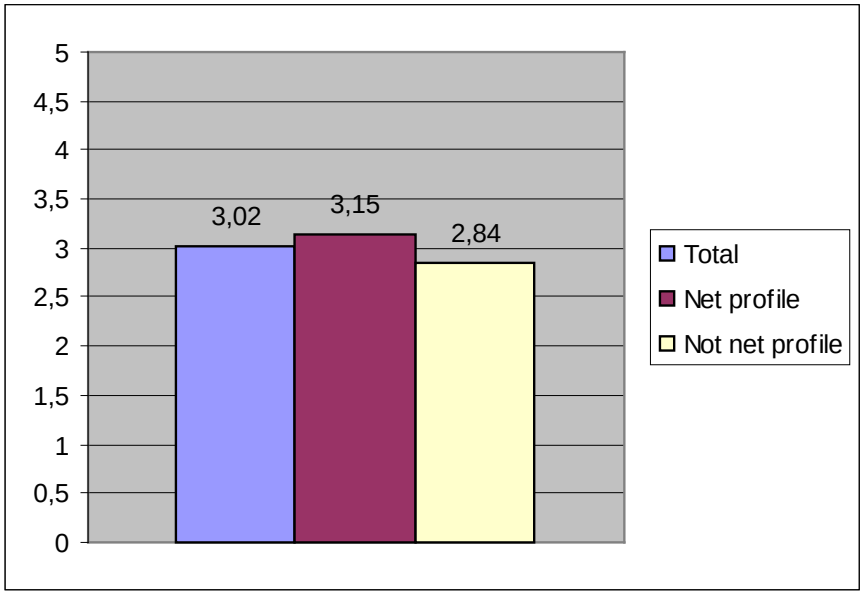
Table 5: Comparison of means for communication questions G(7th) and H(8th)

	Total	VO	Non-VO	F test
C7	3.74	4.02	3.29	0.000
C8	3.94	4.02	3.83	

Table 6: Correlation between communication variables

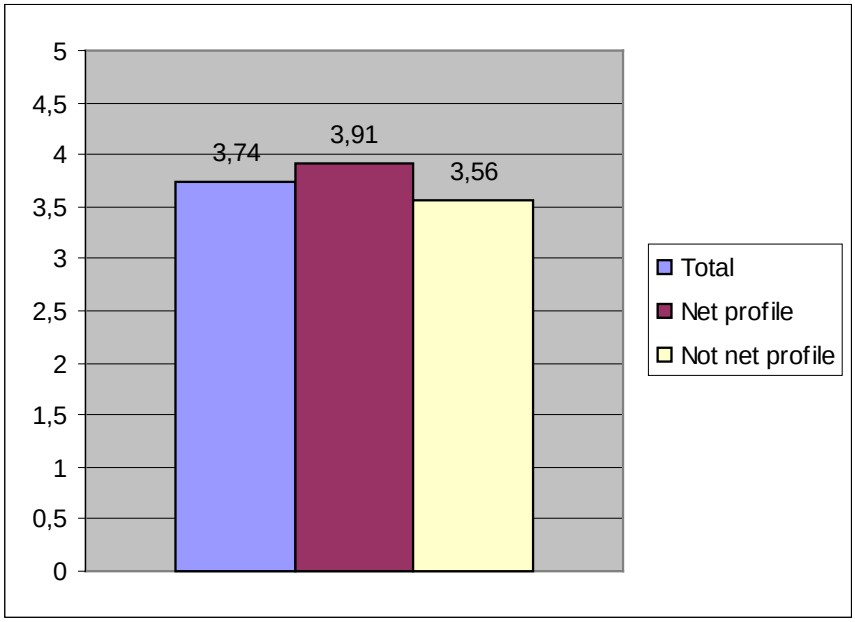
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Communication1	1									
Communication 2	.73	1								
Communication 3	.047	.403**	1							
Communication 4	.021	-0.102	-0.216**	1						
Communication 5	-0.015	.035	.034	.127	1					
Communication 6	.114	-0.087	-0.044	.194**	.488**	1				
Communication 7	.188**	-0.011	.066	.108	.223**	.187**	1			
Communication 8	.104	.139	.161*	.077	.162*	.104	.443**	1		
Communication 9	-0.014	.022	.082	-0.082	.068	.146*	.070	.102	1	
Communication 10	.037	-0.085	.006	-0.034	.040	.172*	.088	.081	.778**	1

Graph 1: Comparison of means for question D according to net profile



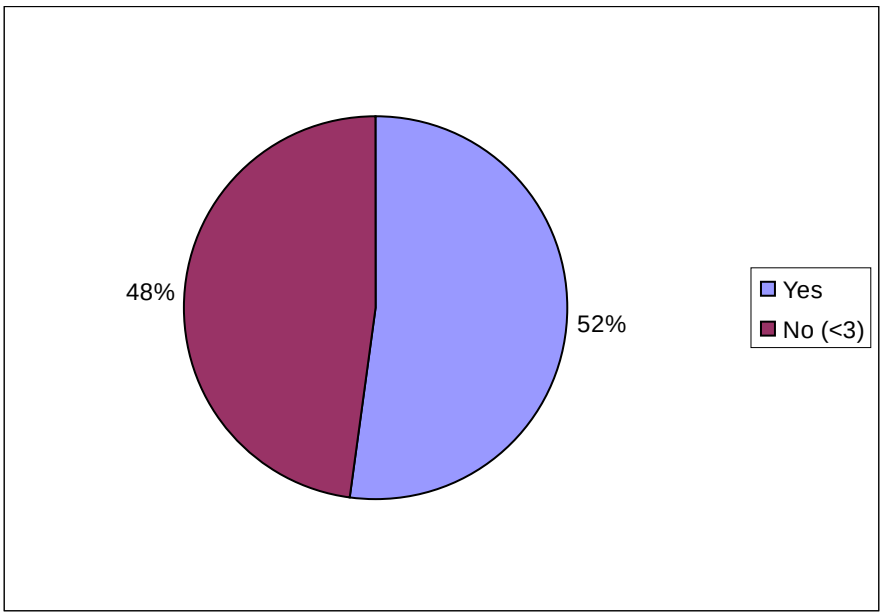
$p<0.05$ for t test

Graph 2: Comparison of means for question G(7th) compared to net profile



p<0.05 for t test

Graph 3: Percentage of participants taking part in virtual communities as anonymous receivers



Graph 4: Percentage of participants taking part in virtual communities as anonymous transmitters