

The effect of e-mail use and adoption on organisational participation: The case of a public administration

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Abstract. Improving organisational participation is becoming more and more important as organisations are trying to shift from a bureaucratic model based on work specialisation and division of labour towards knowledge-intensive organisations built on competence sharing and team working. The aim of this paper is to investigate participation in decision making mediated by e-mail (e-PDM) among organisational members that are in similar hierarchical positions. The conceptual background of the study integrates the organisational theories on PDM and the computer-mediated communication (CMC) literature. Data analysis, based on an empirical research conducted in an Italian governmental agency, investigates the factors that affect the adoption of horizontal e-PDM in the workplace and to what extent this is mediated by the interplay between technology and social context. Our results suggest that social structuration of technology and social processes in organisations do have an impact on e-mail use for participative purposes, and that, along with group characteristics, leadership plays a major role in enabling work group members to increase horizontal e-PDM.

Keywords: E-mail communication, organisational participation, CMC



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1. Introduction

Most of the literature on the effects of Computer-Mediated Communication (CMC) on organisational participation has focused on the supposed increase of democracy in the relationships among superiors and subordinates as a consequence of CMC technologies' adoption. According to several scholars [18, 25, 38, 39], the narrow bandwidth of e-mail causes a limited transmission of status indicators and this enhances the uninhibited participation of lower-level organisational actors in decision making processes.

However, more recent studies have challenged these results. First, it is not true that non-verbal cues are completely filtered out in e-mail communication. Byron and Baldrige [10] found that receivers' personalities influenced their perceptions of the e-mail through perceptions of non-verbal cues such as emoticons and text formality. Second, e-mail communication does not occur in a social vacuum and status indicators may persist. Guèguen and Jacob [23], for example, showed that the status embedded in the signature of e-mails was taken into account by the participants in two experi-

ments: high status solicitors received more responses than low status one. Third, the status structure within organizations, being inherent within all work practices, is unlikely to be undermined by e-mail. In their field-work study, Biggiero et al. [6] have found that low status organizational participants were aware of status differences in both face-to-face and e-mail communication. Also, organizations which favoured offline participation in decision making were more likely than less participative organizations to present forms of participation also via e-mail communication.

Some studies [5] have also considered the effect of CMC on group decision making. Nunamaker et al. [36], for example, argued that the characteristics of electronic meeting systems provide several advantages in terms of participation over face-to-face meetings. McDaniel et al. [32] found that Computer Mediated Asynchronous Communication permits a greater volume of discussion than face-to-face meetings.

Although e-mail is the most diffused form of electronic communication in organizations, most studies have focused on synchronous, text-based electronic systems: electronic meeting systems, instant messaging systems, and group decision support systems [2]. Even if some of the results on the use of synchronous electronic communication can be applied on the use of e-mail communication, research will benefit from a more focused approach. To help address this gap in the literature, this paper focuses on participation mediated by e-mail among organisational members that are in similar hierarchical positions.

Previous research on CMC has adopted two differentiated views on how technology affects the organisational members' behaviour [30]. The *Technological Imperative perspective* considers technology as an exogenous variable that forces or strongly constrains the behaviours of individuals and organisations (technology causes behaviour). According to this view, the objective features of e-mail (asynchronicity, rapid transmission and reply, text based communication, dyadic and multiple connections) deterministically lead to an increase of organisational participation in the workplace. As a result, this approach assigns a small role to the social and organisational context in influencing the actual use of e-mail for both vertical and horizontal participation. The *Emergent Perspective* refuses the idea that e-mail features alone are sufficient to enable organisational participation. Adoption and use of e-mail is rather a result of the interplay between e-mail system appropriation and social interactions. In accordance with organisational theories on

PDM [8, 12, 13, 27, 41], the emergent perspective suggests that electronic participation depends on several contextual factors.

Drawing from the emergent perspective on CMC impacts and the theory on organisational participation, this study examines the effect of task attributes, workgroup's characteristics, leadership style and individuals' attributes on horizontal electronic participation. The paper is structured as follows. In section 2 theoretical considerations are developed to derive hypotheses on the contextual factors which may affect the adoption of electronic horizontal participation. In section 3, we outline the research design of the study by describing the empirical context and the methodology used. In section 4 hypotheses are tested on a data-set of 137 employees of a large public organisation. Finally, in section 5, the paper offers concluding comments on the research findings and a discussion of the theoretical and managerial implications.

2. Theoretical background and hypotheses

2.1. Horizontal and vertical electronic participation in decision making (e-PDM)

Although numerous researchers have attempted to clarify the term "participation," a variety of disparate definitions exist [31]. Among the more commonly used are influence sharing [34], joint decision making [27], and degree of employee involvement in decisions [33]. Drawing from Locke and Schweiger's definition [27], we consider e-PDM to be joint decision making mediated by e-mail. This definition is general enough to include three distinct dimensions of e-PDM. *Horizontal e-PDM* refers to electronic joint decision making among workgroup members in the same hierarchical position. *Bottom-up (vertical) e-PDM* refers to subordinates' electronic participation in decision-making with supervisors, and *top-down (vertical) e-PDM* concerns supervisors' electronic participation in decision-making with subordinates.

2.2. Leadership style, group culture and horizontal e-PDM

Leadership style is widely recognised as one of the most influential factors in PDM. Literature on leadership [4, 27, 40] individuates several leadership styles in the continuum ranging from the entirely autocratic to the purely democratic. Stewart and Manz [40] crossed

this dimension (autocratic-democratic) with the degree of leader involvement (highly involved or laissez faire). According to these authors, autocratic leaders undermine the emergence of a climate of communication openness, information exchange, self-management and participation in decision making among subordinates that reduce the likelihood of PDM both in vertical and horizontal relationships.

Besides leadership style, the organisational literature also includes the group's culture, norms and attitude as relevant contextual factors affecting PDM effectiveness. As Locke and Schweiger [27] state: "Groups can be just as autocratic as supervisors, if not more so, and may thereby inhibit the expression of new or unpopular ideas" (p. 321).

In the CMC literature, deterministic approaches to organisational consequences of technology have largely underestimated the influence of leadership style and group culture on electronic participation. Thanks to its technical characteristics, e-mail is often viewed as an intrinsically democratic medium [28] that increases uninhibited communication among organisational members and information sharing. In this perspective, the objective features of e-mail (openness, informality, reduced social cues, higher reachability) are expected to increase electronic participation independently from social factors linked to leader and group's attributes. The Adaptive Structuration Theory [17] opposes this view. According to DeSanctis and Poole [17], although the technical features of e-mail could facilitate and support participation, the social context of the organisation can undermine this potential kind of technology appropriation. Consistently with the emergent perspective, Dandi and Schiavi [15] found evidence that communication patterns (through several media, including e-mail) among colleagues working in units with autocratic leaders and low group participative culture are less dense than patterns among colleagues in units co-ordinated by participative leaders and characterised by a group climate that supports freedom of speech.

Hypothesis 1: Autocratic leaders inhibit horizontal e-PDM

Hypothesis 2: The level of group participative culture will positively influence horizontal e-PDM

2.3. Task attributes and horizontal e-PDM

In the PDM literature, task complexity has been associated with a higher demand for organisational par-

participation [35]. Highly complex, non-routinised and unstructured tasks require extensive co-ordination and information sharing among the people who are performing them [22]. From a network perspective the more complex is the task the more dense should be the network of communication among members involved. Complex tasks thus would require dense structures of communication (in which each node is linked to many others) while simple or routine task may deploy formal hierarchical structures of communication. Complex tasks are difficult to control by a supervisor (due to their poor analysability and the variety of skills they require) and this enhances the need for horizontal participation. Consequently, in the organisational literature, task complexity is expected to have a positive influence on participation.

In the CMC literature, the relationship between task complexity and electronic participation is more ambiguous and differentiated than it appears in the PDM literature. According to the Media Richness Theory [14], media differ in “communication richness” depending on their feedback ability, communication channel capability, source and language variety. According to the Media Richness Theory, organisational members rationally adopt the communication medium which better support their information requirements. This implies that organisational members use richer media, such as face-to-face (FtF) and telephone, to manage complex tasks in order to reduce equivocality of information and increase co-ordination effectiveness. Since e-mail, based on its objective features is expected to be a poor medium as it allows for slow feedback capability and transmission of text-based cues, the Media Richness Theory predicts that organisational members are less willing to use e-mail for horizontal participation when they have to accomplish complex tasks. This deterministic view of the relationship between task complexity and e-PDM is opposed by the emergent perspective on computer-mediated communication. In this regard, Fulk [21] argues that media choice depends on the socially constructed perceptions of utility of the medium rather than on its objective features. According to the Adaptive Structuration Theory [17], the actual structuration of the technology, that is the degree and the way of appropriation of it, is an emergence of the course of social interaction. Thus, if in a specific organisational context, e-mail is perceived as a clear, not ambiguous, and empowering medium that facilitates information exchange and co-ordination, then organisational members will use more the e-mail to

participate with their peers to accomplish complex tasks.

Hypothesis 3: The perception of e-mail features will mediate the relationship between task complexity and horizontal e-PDM in such a way that horizontal e-PDM will have the strongest, positive relationship with task complexity when positive perceptions of e-mail as a useful means of communication are high

2.4. Vertical e-PDM and horizontal e-PDM

In the literature there is no reference of a supposed relationship between vertical and horizontal e-PDM. However we wanted to investigate the possibility of an influence of vertical e-PDM on the horizontal one. Consequently we decided to introduce an exploratory hypothesis to test this issue. As a matter of fact it could be argued that the actual use of e-mail in vertical relationships may affect the members’ likelihood to use the electronic medium for horizontal participation because in work organisation vertical relationships are supposed to be more formal and normative than peer-to-peer ones. This may imply that the type of relationship members establish with the supervisor is likely to influence and shape also the understandings that workgroup members share regarding what constitute appropriate electronic communication behaviour with other work group members.

Hypothesis 4: The higher is the member’s attitude to use e-mail for vertical PDM (superior/subordinates relationship), the higher his/her use of e-mail for horizontal participation

Figure 1 summarises the hypotheses outlining the effects of contextual factors on e-PDM discussed in this section.

3. Data and methods

3.1. Research setting

Research was undertaken in an Italian governmental agency that will be referred to as IPA. IPA was a former department of one of the Italian Ministries that gained autonomy (in organisational, managerial, administrative, financial and patrimonial issues) in January 2000 as a consequence of an important process of decentralisation and reorganisation of the Ministry and, more generally, of the Italian Public Administration.

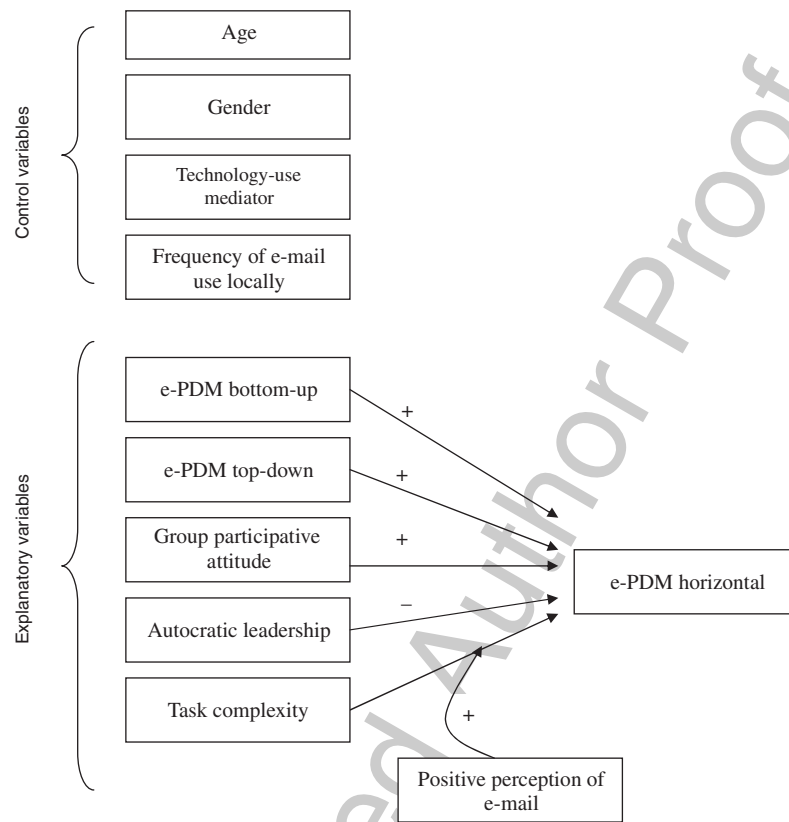


Fig. 1. Contextual factors affecting horizontal e-PDM.

344 IPA is a large and complex organisation with about
 345 37,000 employees and a geographically dispersed struc-
 346 ture designed along 3 main geographical levels: central,
 347 regional, and local. At the central level there are
 348 7 departments: three of them are focused on the core
 349 activity of the Agency while the other four include
 350 External Institutions Relationships, Human Resources
 351 Management, Administration, and Systems and Pro-
 352 cesses. At the regional level there are 19 Regional
 353 Departments (one per region) and 2 Provincial Depart-
 354 ments (due to the existence of 2 provinces that have
 355 a special administrative status similar to the regional
 356 one). At the local level there are about 385 Local Offices
 357 located all around the Italian peninsula.

358 Since its creation, IPA has made significant efforts
 359 to overcome the bureaucratic culture inherited from the
 360 past. Before the establishment of IPA as an autonomous
 361 agency, the internal communication system was mainly
 362 based on traditional communication channels (reports,
 363 official notes, memos) following a strict top-down
 364 flow. Recently, IPA has launched the implementation
 365 of electronic communication as an important means

366 to improve internal communication, to strengthen the
 367 sense of affiliation to the organisation, and to enhance
 368 the overall level of employees' participation. In order
 369 to achieve these goals, IPA's top management has sus-
 370 tained the creation of a community of practice called
 371 "network of internal communication supporters" with
 372 the aim of facilitating the implementation of the new
 373 internal communication strategy and especially, of the
 374 e-mail system. This group of volunteers was created
 375 in January 2001 and now it counts up to 600 persons.
 376 Members of the "network of internal communication
 377 supporters" have the role of facilitators and technology-
 378 use mediators [37] of the e-mail system and other forms
 379 of internal communication.

380 When the decision of implementing a common
 381 e-mail system throughout the whole organisation was
 382 taken, only top managers had a personal e-mail address.
 383 Some regional and local offices had a collective
 384 address while some regional directions had independ-
 385 ently adopted their own informal e-mail systems. The
 386 implementation of the common e-mail system was
 387 undertaken gradually. The criterion chosen in order to

388 prioritise the attribution of personal e-mail addresses
389 was the position held in the organisational hierarchy.
390 Therefore, in the initial stage of implementation of the
391 electronic communication system, having a personal
392 e-mail account was a status symbol that increased the
393 status difference perceptions within IPA. At the time
394 the study has been conducted, the process of e-mail
395 implementation was almost completed. In central direc-
396 tions, all employees had already a personal e-mail
397 account. Only in some local and regional offices there
398 were still collective addresses managed by the offices'
399 responsible or by the local supporter of the Network of
400 Communication Supporters.

401 3.2. Sample and data

402 The research integrates qualitative and quantitative
403 data collection methods in a two-stage case study
404 design. At first stage, we collected organisational docu-
405 ments and conducted in-depth qualitative interviews
406 focused on the introduction of the e-mail system and
407 its relation with the on-going process of organisa-
408 tional change. All the interviews were based on a
409 common interview guide. The first interviews were
410 done collectively by the authors and by a research
411 assistant well familiar with the research topic. Subse-
412 quently, the interviews were carried out individually
413 and were tape-recorded and verbatim transcribed. The
414 target groups for the interviews were the HRM depart-
415 ment, the Systems and Processes Department and the
416 Network of Supporters. Within the HRM department
417 we interviewed employees from the Internal Communi-
418 cation Office and the Quality Management Office. The
419 Internal Communication Office is part of HRM Depart-
420 ment and is responsible for all the activities related
421 to the internal communication, including the content
422 management of the intranet. The Systems and Pro-
423 cesses Department is in charge of all the activities that
424 relate to the technical management of IPA's information
425 systems.

426 Qualitative interviews and documentary analysis
427 were aimed to gain in-depth knowledge of the role that
428 e-mail adoption has played in the process of change
429 that IPA has encountered. Specifically, the interview
430 guide focused on the criteria followed in the implemen-
431 tation process. We carried out 18 interviews (14 men
432 and 4 women) with 12 managers and employees of
433 the central departments and 6 members of the regional
434 and local offices (at regional and local level we inter-
435 viewed employees that were involved in the Network
436 of Communication Supporters). As it concerns docu-

437 ment analysis, we collected the organisational chart, the
438 role descriptions for the people we interviewed, gen-
439 eral information from the web-site and also from the
440 intranet, copies of the internal communication newspa-
441 per, the internal rules about e-mail use and the FAQs
442 on the same subject and some samples of work-related
443 e-mails.

444 In the second phase, we collected quantitative data
445 through an on-line structured questionnaire. Prelim-
446 inary results based on interviews and documentary
447 data were also used to guide us in design of the
448 questionnaire. The sample for the study consisted of
449 550 employees randomly selected (250 from the Net-
450 work of Supporters). To secure a representative sample
451 of the organisational population, we obtained basic
452 information from the organisation on the population
453 characteristics with respect to gender, geographical
454 distribution (by macro-regions: Northern, Central and
455 Southern regions) and organisational levels (central,
456 regional and local departments/offices).

457 Surveys were distributed on-line in May 2003 and the
458 confidentiality of completed surveys was guaranteed
459 to all respondents. Three on-line questionnaires were
460 returned as "Undeliverable" by the System Admin-
461 istrator, so the actual sample counted 547 persons.
462 Finally, the return of 228 completed questionnaires
463 yielded a response rate of 41.7 percent. The average
464 age of the respondents was 42,28 years (s.d. = 7.5), and
465 37.95 percent of them were women. Forty two per-
466 cent of respondents received a personal e-mail account
467 from the organisation after 2001, 40.6 percent in 2001,
468 15.6 percent in 2000, and only 1.8 percent of respon-
469 dents had a personal e-mail account before 2000.
470 77.4 percent of respondents were employed in local
471 offices and 22.6 per cent in Central and Regional Direc-
472 tions. 11.5 per cent of respondents had a master or
473 Ph.D., 33.6 per cent were university graduates, 52.7
474 held a high-school diploma, and 2.2 of respondents
475 held only an elementary school diploma. The sample
476 respondents had demographic characteristics very sim-
477 ilar to those of the target population, suggesting it was
478 a representative one.

479 3.3. Measures

480 *Horizontal e-PDM* was measured by four items that
481 asked about the individual's willingness to use the
482 e-mail with other colleagues with a similar hierarchical
483 position to 1) influence their decisions; 2) to propose
484 solutions to their problems; 3) to let them follow what
485 one does; 4) to raise or express a critique. All items used

486 a seven-points response scale ranging from “not at all”
487 to “very much”. Horizontal e-PDM had a Cronbach’s
488 alpha of 0.84.

489 *Vertical e-PDM bottom-up* was measured by three
490 items that asked about the individual’s willingness to
491 use the e-mail with the direct supervisor to 1) influ-
492 ence his/her decisions; 2) to propose solutions to his/her
493 problems; 3) to raise or express a critique to him/her.
494 All items used a seven-points response scale ranging
495 from “not at all” to “very much”. Cronbach alpha for
496 this measure was 0.77.

497 *Vertical e-PDM top-down* was measured by three
498 items that asked about the individual’s willingness to
499 use the e-mail with subordinates to 1) exchange per-
500 sonal information; 2) ask for suggestions/explanations
501 on complex task; 3) to let them follow what one does.
502 All items used a seven-points response scale ranging
503 from “not at all” to “very much”. Horizontal e-PDM
504 had a Cronbach’s alpha of 0.77.

505 *Task complexity* was measured by three items that
506 asked about the task’s degree of variety and variability.
507 Following Ashby’s [1] definition of complexity, task
508 complexity has been measured in terms of the rate of
509 task variety (number of different activities that must be
510 dealt with everyday to perform the task) and rate of
511 task variability (extent to which activities are subject to
512 change). (The three items were “In a work day I have
513 to perform many different activities”, “I often need to
514 deal with new activities”, “How often have the course of
515 your planned activities changed in the last 6 months?”.)
516 All items used a seven-points response scale ranging,
517 for the first two items from “not at all” to “very much”,
518 and for the third one from “never” to “very often”. Task
519 complexity had a Cronbach’s alpha of 0.75.

520 *Perception of e-mail features* was measured by a
521 six-items scale. All items used a seven-points scale
522 ranging from “strongly disagree” to “strongly agree”.
523 (The six items were “e-mail allows clear communica-
524 tion”, “e-mail allows quick resolution of problems”,
525 “e-mail makes clear where accountability lies”, “e-mail
526 allows people to avoid conflict”, “e-mail allows crit-
527 icism expression” and “e-mail reduces hierarchical
528 distance”.) The Cronbach for the six items was 0.71.

529 *Group participative attitude* was measured by a
530 three-item scale that asked about the group attitude
531 towards participative behaviour. All items used a seven-
532 points response scale ranging from “strongly disagree”
533 to “strongly agree”. (The three items were “respon-
534 sibilities are shared by all members”, “who raises
535 constructive critics on other colleagues’ work does not
536 fear to be penalized”, “who proposes alternative point

of views is appreciated”). The Cronbach for the three
items was 0.70.

Leadership style: we used a one item-scale of hier-
archical manager based on Hofstede’s [26] measure
of leadership style. The item describes a hierarchi-
cal manager in the following terms: “Usually makes
his/her decisions promptly and communicates them to
his/her subordinates clearly and firmly. S/he expects
them to carry out the decisions loyally and without rais-
ing difficulties” and then it asks the respondent to asses
“How much does your direct supervisor most closely
correspond to this manager?” on a seven-point scale
ranging from “not at all” to “very much”. We calculated
a binary variable to distinguish hierarchical managers
from not hierarchical by recoding as hierarchical (1) all
responses above the mean and as not hierarchical (0) all
responses to the above item that were below the mean
value.

3.4. Control measures

To reduce the likelihood that individuals’ demo-
graphic characteristics would confound the hypotheses
examined in the study we included the following mea-
sures as control variables.

Age: elder people are usually less likely to adopt and
trust electronic devices. Therefore we wanted to control
if this occurred in our sample and had an impact on their
degree of electronic participation. Age was measured in
number of years.

Gender: Gender differences may also influence par-
ticipation outcomes. Denton and Zeytinoglu [16] found
that women were less likely than men to perceive them-
selves as participating in decision-making, even when
controlling for other relevant variables. According to
a deterministic view of technology, participation of
female members in organisational decision processes
is likely to increase in virtual settings. According to
the Reduced Social Cues Theory [39], e-mail allows a
relative anonymity and reduction of perception of the
gender that can let female members participate more
easily than FtF. However, recent studies found that gen-
der differences are not completely filtered out in CMC.
Empirical evidence was found that men are more likely
to be dominating and controlling, whereas women are
more expressive and likely to try to maintain relation-
ships in e-mails, instant messaging, and Internet relay
chat conversations [3, 20, 24]. To control for differences
among men and women, we included gender as binary
variable (“man” = 0, “woman” = 1).

Technology-use mediators: as we had respondents that were members of the “Network of Internal Communication Supporters”, we also used a dummy code to control for effects related to the specific role of technology-use mediators played by the supporters in the organisation (“member of the network” = 1, “not member of the network” = 0).

Frequency of e-mail sent locally: we measured the frequency of e-mail use with colleagues located in the same room or in close ones to control for the effect of physical proximity on horizontal e-PDM. Frequency of e-mail sent locally was measured with a one-item five-point scale ranging from “never” to “daily”.

For each scale with multiple items, we used the average values as the focal variables.

4. Results

Table 1 reports the means, standard deviations, and correlations for the dependent and independent variables.

The means of the three measures of electronic participation are quite low. However it is worth noticing that horizontal e-PDM scores the highest value.

Among the control variables only gender was not significantly correlated with horizontal e-PDM. This result suggests that, in the studied organisation, there are not gender inequalities in peer-to-peer electronic participation. However, since we did not measure non-electronic PDM, we can not assess the actual impact of

e-mail on reducing possible gender inequalities in horizontal participation. As expected age was negatively correlated with the dependent variable ($r = -0.163$, $p < 0.05$) while both the frequency of e-mail use locally and technology-use mediator variables shown a positive and significant correlation. Among the explanatory variables, only autocratic leadership was not significantly correlated with horizontal e-PDM. Both the vertical e-PDM variables exhibited the highest correlation coefficients. As can be seen in Table 1, some of the independent variables were intercorrelated (e.g. the correlation for e-PDM top-down and bottom-up was 0.419 and significant at $p < 0.001$).

We tested our hypotheses with hierarchical (blockwise entry) multiple regression analysis. Before conducting regression analysis we examined residual plots to verify that assumptions of linearity and homoscedasticity were met. Model 1 included estimated effects for a baseline model with only control variables while model 2 included also the explanatory variables. Table 2 reports regression results for the two models. Since we found that some independent variables were intercorrelated, we checked the VIF and tolerance statistics in order to assess multicollinearity problems. For the two models the VIF values were well below 10 and the tolerance statistics all well below 0.2. The average VIF was 1.031 for the baseline model (model 1) and 1.173 for the full model (model 2). Therefore we could safely conclude that collinearity was not a problem for the two models.

Table 1
Means, standard deviation and correlations^a

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Horizontal e-PDM	2.90	1.57	1.000									
2. Top-down e-PDM	1.72	1.65	0.577***	1.000								
3. Bottom-up e-PDM	1.99	1.27	0.689***	0.419***	1.000							
4. Task complexity × perception of e-mail	19.08	8.33	0.339***	0.342***	0.385***	1.000						
5. Group participative attitude	4.03	1.24	0.266**	0.106	0.089	0.179*	1.000					
6. Autocratic supervisor	0.44	0.50	-0.043	0.070	0.077	0.081	0.201**	1.000				
7. Frequency of e-mails locally	1.23	1.13	0.293***	0.144*	0.110	0.082	0.155*	-0.060	1.000			
8. Technology-use mediator	0.67	0.47	0.145*	-0.006	-0.001	0.246**	-0.021	-0.040	0.003	1.000		
9. Gender	0.33	0.47	-0.025	-0.051	0.055	0.30	-0.113	0.072	-0.114	0.026	1.000	
10. Age	41.74	7.61	-0.163*	0.021	-0.109	-0.076	-0.059	0.098	-0.166*	-0.126	0.075	1.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^a $N = 137$.

Table 2
Multiple regression analysis^a

	Model 1		Model 2	
	Beta	<i>t</i>	Beta	<i>t</i>
1. Horizontal e-PDM	–	–	–	–
2. Top-down e-PDM	–	–	0.342***	5.934
3. Bottom-up e-PDM	–	–	0.541***	9.219
4. Task complexity × perception of e-mail	–	–	–0.066	–1.126
5. Group participative attitude	–	–	0.198***	3.709
6. Autocratic supervisor	–	–	–0.124*	–2.367
7. Frequency of e-mails locally	0.277**	3.327	0.145**	2.762
8. Technology-use mediator	0.131	1.585	0.156**	2.944
9. Gender	0.010	0.124	0.012	0.229
10. Age	–0.101	–1.209	–0.050	–0.952
<i>F</i>	4.356**		44.348***	
<i>R</i> ²	0.117		0.678	
Adjusted <i>R</i> ²	0.090		0.655	
ΔR^2	0.117		0.562	

^aValues are standardised regression coefficients.

As can be seen in the baseline model including only the control variables (model 1), only frequency of e-mail sent locally was significant and positively related to horizontal e-PDM (Beta = 0.277, $p < 0.01$). This shows that horizontal electronic participation is more likely to happen when group members use e-mail to communicate with physically close colleagues, that is when they perceive e-mail as an appropriate means for participating in decision processes with physically close colleagues. This result may confirm – as Bikson et al. [7] argued – that “electronic links [as the emergent perspective states] primarily enhance existing patterns of communication rather than creating new ones” (p. 102).

As shown in model 2 we found support for hypothesis 1. Autocratic leadership had a negative and significant impact on horizontal e-PDM (Beta = –0.124, $p < 0.05$).

Hypothesis 2 was also supported. As it is shown in Table 2 the group participative attitude had a positive and significantly influence on the use of e-mail to participate with peer members (Beta = 0.198, $p < 0.001$).

Hypothesis 3 predicted that individuals’ positive perception of e-mail features interact with task com-

plexity to influence horizontal participation. As shown in model 2, the interaction variable was not significant and thus hypothesis 3 was not supported.

Hypothesis 4 was strongly supported. Both top-down e-PDM (Beta = 0.342, $p < 0.001$) and bottom-up e-PDM (Beta = 0.541, $p < 0.001$) made significant contributions, although the latter had a prominent role.

In model 2, the frequency of e-mails sent locally confirmed its positive impact (Beta = 0.145, $p < 0.01$) on the dependent variable. Among the other control variables, only technology-use mediators had a significant and positive impact (Beta = 0.156, $p < 0.01$) on horizontal e-PDM.

The results of the hierarchical regression analysis shown in Table 2 indicate that, when the five explanatory variables are added to the regression model, the R^2 for the full model increases from 0.117 to 0.678. In other words, adding the independent variables to the baseline model (which included only the four control variables) enabled the model to explain an additional 56.2 percent of the variance. The incremental F statistic of 44.348, corresponding to the 56.2 percent increase in R^2 , was significant at $p < 0.001$.

5. Discussion and conclusion

In this study, we revisited an important topic in management research – organisational participation in decision-making – with a focus on the use of e-mail for participative purposes. Building on the CMC literature and the organisational participation theory, we distinguished three different forms of electronic participation: horizontal, bottom-up, and top-down.

Empirical results from the studied organisation shows that the average levels of e-PDM are quite low for horizontal, top-down, and bottom-up relationships. This finding may suggest that organisational members are not willing to use e-mail for participative purposes. However, since we could not compare electronic and non-electronic participation, this result cannot provide any evidence on media preferences for participation. Therefore, the limited e-PDM could reflect a low level of organisational participation. This interpretation finds some support from the qualitative data we collected in the first stage of the case study design. Interviews with managers and employees confirmed that IPA’s culture was still influenced by the bureaucratic management style inherited from the public administration to which IPA used to belong. As previous research shows, this organisational characteristic may act as a barrier to

714 effective participation [11]. The rationale for this con- 765
715 textual effect is that bureaucratic organisations may 766
716 embrace rules and regulations that limit autonomy and 767
717 self-expression, thus blocking even the potential for any 768
718 form of participation. 769

719 Another important consideration related to the low 770
720 level of e-PDM in the studied organisation concerns 771
721 the recent introduction of e-mail in the organisation. 772
722 As anticipated in the sample's description, the imple- 773
723 mentation of the e-mail system started in 2000 and 774
724 42 percent of respondents participating in the study 775
725 received a personal e-mail account from the organisa- 776
726 tion after 2001. This recent introduction of e-mail in 777
727 IPA could account for the low level of e-PDM found. 778
728 According to the Social Information Processing Theory 779
729 [42, 43], the organisational impacts of CMC adoption 780
730 are time-dependent. In Walther's view, all other things 781
731 being equal, given sufficient time and exchange of mes- 782
732 sages, FtF and CMC communication tend to be the 783
733 same. Following this approach, it could be argued that, 784
734 in IPA, the low levels of e-PDM should be ascribed to 785
735 the recent introduction of e-mail and that, in a longitu- 786
736 dinal perspective, it would be likely that the use of e-mail 787
737 for participation would equate the use of FtF and other 788
738 mediated forms of participation. It is worth noticing that 789
739 the role of Communication Supporter as a technology- 790
740 use mediator is positively related to horizontal e-PDM. 791
741 This confirms that trained and motivated people are 792
742 more likely to use e-mail effectively for PDM. 793

743 Although we found a limited use of electronic partici- 794
744 pation in the studied organisation, the empirical results 795
745 confirm that horizontal e-PDM is affected by a num- 796
746 ber of contextual factors. Our findings show that, even 797
747 in a computer-mediated setting, leaders attributes and 798
748 group characteristics affect peer-to-peer participation. 799
749 Although e-mail, in the Technological Imperative per- 800
750 spective, is supposed to enhance PDM in any context of 801
751 use, our study shows that autocratic leadership inhibits 802
752 the use of e-mail for participative purposes and that 803
753 horizontal e-PDM is more likely to happen when the 804
754 workgroup shares a participative culture. 805

755 The study also shows interesting findings concerning 806
756 the relationship between participation, task complex- 807
757 ity and media choice. Our results provide empirical 808
758 support for the contingency assertion [22] that task 809
759 complexity, by creating an increase in horizontal need 810
760 for information sharing and for exchange of ideas and 811
761 suggestions, enhances participation. Indeed, we found 812
762 that higher levels of task complexity were associated to 813
763 a more intense use of e-mail for participative purposes 814
764 with other peer colleagues. This result clearly rejects 815

the Media Richness Theory argument that organisa- 765
766 tional members would not use "poor media" such as 767
768 e-mail to communicate and coordinate with their peers 769
770 when dealing with complex tasks. It is also interest- 771
772 ing to note that this result does not either confirm the 773
774 Emergent Perspective which considers that it is not task 775
776 complexity alone to determine media choice but the 777
778 interaction among technology features and the individ- 779
780 uals' perception of the technology. The results of this 781
782 study show that when task complexity increases, elec- 783
784 tronic participation grows even when organisational 785
786 members consider e-mail as an ambiguous means of 787
788 communication. Indeed, in the studied organisation, 789
790 the members' perception of e-mail did not mediate the 791
792 relationship between electronic participation and task 793
794 complexity. 795

796 Another interesting finding of this study arises 797
798 from the relationship between horizontal and vertical 799
800 e-PDM. We found that, although horizontal e-PDM is 801
802 higher than vertical e-PDM, when the use of e-mail 803
804 for vertical PDM becomes an habit, the likelihood for 805
806 horizontal PDM also increases. This result has a lot 807
808 of intuitive appeal and it suggests that the type of 809
810 electronic communication members establish with the 811
812 supervisor also influences and shapes their communi- 813
814 cation behaviour with peer colleagues. However we 814
815 consider this as a preliminary finding which needs to 815
816 be theoretically validated and empirically confirmed in 816
817 future research. 817

818 Our study extends prior research in three ways. First, 819
820 it sheds light on the horizontal dimension of PDM, 821
822 that has been quite under-analysed in the organisation 822
823 literature, traditionally focused on vertical relation- 824
825 ships. Even the literature on CMC has preferred to 826
827 focus on the supposed equalisation effect of tech- 828
829 nology among different-status members. In our view, 829
830 horizontal participation is becoming more and more 830
831 important as organisations increasingly rely on team 831
832 work and knowledge sharing to achieve effectiveness 832
833 in a complex environment. Consequently, we have 833
834 addressed our interest on peer-to-peer participation. 834
835 Second, our study does not support the determinis- 835
836 tic assumptions of most computer-mediated literature. 836
837 As previously analysed, our results confirm that social 837
838 structuration of technology and social processes in 838
839 organisations do have an impact on e-mail use for 839
840 participative purposes. Third, from a methodologi- 840
841 cal point of view, most CMC studies on PDM are 841
842 based on one-shot laboratory experiments with under- 842
843 graduate students carrying out simple group tasks 843
844 [9]. Several considerations induce us to be cautious 844
845

816 about the extension of the results of these experi- 867
817 ments to the organisational context. First, the limitation 868
818 of time (few minutes or hours) may force partici- 869
819 pants in experiments to use e-mail as a synchronous 870
820 medium, like a chat, rather than an asynchronous one. 871
821 Second, tasks performed during experiments are quite 872
822 different from organisational tasks and students have 873
823 different incentives or none to perform the assigned 874
824 tasks. Third, differently from students in experimen- 875
825 tal settings, organisational members are aware of the 876
826 status of people they interact with. Fourth, in natu- 877
827 ral settings (as real organisations are), interactions 878
828 via e-mail are highly dependent on the pre-existing 879
829 interactions through other means of communication. 880
830 Finally, unlike organisational members, participants in 881
831 experimental studies expect to have no more future 882
832 interactions with other participants. All these consid- 883
833 erations severely hinder the assumption that short-time 884
834 experiments can provide a realistic proxy of what occurs 885
835 in organisations. Our study, by analysing real organi- 886
836 sational members in their workplace overcomes these 887
837 limitations. 888

838 Our study has two main managerial implica- 889
839 tions. First, our findings show that organisational 890
840 change is not only a matter of technology imple- 891
841 mentation, as the Technological Imperative approach 892
842 suggests, but it necessitates the assessment and man- 893
843 agement of contextual social factors. Empirical results 894
844 from this study indicate that every effort of technol- 895
845 ological/organisational change, aimed at making an 896
846 organisation more flexible and reactive through an 897
847 increase of PDM, should take into account the influence 898
848 of leadership style and group culture on the employees' 899
849 use of technology for participative purposes. Con- 900
850 sequently, technology introduction and adoption for 901
851 increasing teamwork cannot be effective without an 902
852 organisational effort in changing coherently also man- 903
853 agerial practices, leadership style and group culture. 904
854 Internal communication should be addressed to spread 905
855 the vision of change among managers, and to transform 906
856 them into the principal supporters of change. Strangely 907
857 enough, in the literature on CMC, this achievement is 908
858 quite new and under-represented (Technology Impera- 909
859 tive still dominates over the Emergent Perspective). On 910
860 the contrary, in organisation theory the role of contex- 911
861 tual factors on PDM is a finding that we can track since 912
862 the first anti-fordist perspectives such as the School of 913
863 Human Relations, Quality of Working Life and Socio- 914
864 Technical Theory [19, 27]. 915

865 The second important implication of this study 916
866 is that, along with group characteristics, leadership 917

867 plays a major role in enabling and supporting a 868
869 group to increase horizontal e-PDM. The latter actu- 870
871 ally depends not only on peer-to-peer relationships but 872
873 also on the role that immediate superiors play in let- 874
875 ting people become accountable and responsible for 876
877 the group as a whole. Leaders are those who cre- 878
879 ate the organisational climate and the organisational 880
881 framework that shape the development of horizon- 882
883 tal participation. The lack of leader's openness and 884
885 feedback towards upward communication can increase 886
887 status/cognitive distance, equivocality and a sense of 888
889 powerlessness among team members: "A «hands-off» 890
891 approach fails to cultivate skills required to team self- 892
893 management. These skills include self-reinforcement, 894
895 self-criticism, self-goal-setting, self-observation, self- 896
897 expectation and rehearsal" [29, p. 122]. In particular 898
899 the study shows evidence that autocratic leadership 900
901 has a negative effect on horizontal e-PDM. Further- 902
903 more it is also clear that wherever open relationships 904
905 among superiors and subordinates do exist through 906
907 e-mail communication, then the likelihood of repli- 908
909 cating these relationships with peer-level members 909
910 increases. 911

912 This study presents some limitations. First, we recog- 913
914 nise the importance of time in organisations, due to the 914
915 dynamics that are inherent in all social and organisa- 915
916 tional processes. Our ability to evaluate those changes 916
917 is severely hindered by a lack of longitudinal data. How- 917
ever this study is only a preliminary step in investigating 918
horizontal e-PDM: our purpose is to integrate our find- 918
ings with subsequent data gathering in IPA. As the 919
learning curves increase and as social joint construc- 919
tion of the technology develops, we expect to witness 920
changes in the members' use of e-mail for participa- 920
tive purposes as Walther suggests [42, 43]. Second, 921
because our research design is cross-sectional, the data 921
from our survey do not allow us to necessarily predict 922
causality. Future research using a longitudinal design 922
is likely to provide important insights on causal rela- 923
tionships among variables investigated in this study. 923
Similarly, since the variables were measured at the 924
same time from the same source, common method vari- 924
ance cannot be fully ruled out. Third, we only analysed 925
e-PDM. Therefore our study does not include compar- 925
isons among media impact on horizontal PDM. Future 926
research might address this comparison by examin- 926
ing electronic and non-electronic peer-to-peer PDM. 927
Finally, we conducted the research in one Italian public 927
organisation. A generalisation of our findings requires 928
further investigation in different organisational con- 928
texts. 929

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References

- [1] R.W. Ashby, *An Introduction to Cybernetics*, Chapman and Hall, London, (1956). Available online at: <http://pespmc1.vub.ac.be/ASHBBOOK.html>.
- [2] B.B. Baltes, M.W. Dickson, M.P. Sherman, C.C. Bauer and J.S. LaGanke, Computer-mediated communication and group decision making: A meta-analysis, *Organizational Behavior and Human Decision Processes* **87**(1) (2002), 156–179.
- [3] N. Baron, See you online: Gender issues in college student use of instant messaging, *Journal of Language and Social Psychology* **23** (2004), 397–423.
- [4] J.C. Barrow, The variables of leadership: A review and conceptual framework, *Academy of Management Review* **2**(2) (1977), 231–251.
- [5] G.R. Berry, Can computer-mediated asynchronous communication improve team processes and decision making? Learning from the management literature, *Journal of Business Communication* **43**(4) (2006), 344–366.
- [6] L. Biggiero, A. Sammarra, C. Muzzi and R. Dandi, Organizational consequences of email adoption and diffusion: Theoretical issues and empirical results, in: *eAdoption and the Knowledge Economy: Issues, Applications, Case Studies*, P. Cunningham and M. Cunningham, eds, IOS Press, Amsterdam, 2004, pp. 134–140.
- [7] T.K. Bikson, J.D. Eveland and B.A. Cuter, Flexible interactive technologies for multiperson tasks: Current problems and future prospects, in: *Technological Support for Work Group Collaboration*, M. Olson, ed., Lawrence Erlbaum Associates, Inc., Hilldale, N.J., 1989, pp. 89–112.
- [8] S.J. Black and H.B. Gregersen, Participative decision-making: An integration of multiple dimensions, *Human Relations* **50**(7) (1997), 859–878.
- [9] P. Bordia, Face-to-face versus computer-mediated communication: A synthesis of the experimental literature, *The Journal of Business Communication* **34** (1997), 99–120.
- [10] K. Byron and D.B. Baldrige, E-mail recipients' impressions of senders' likeability: The interactive effect of nonverbal cues and recipients' personality, *Journal of Business Communication* **44**(2) (2007), 137–160.
- [11] J.A. Conger and R.N. Kanungo, The empowerment process: Integrating theory and practice, *Academy of Management Review* **13**(3) (1988), 471–482.
- [12] J. Cotton, D.A. Vollrath, K.L. Froggatt, M.L. Lengnick-Hall and K.R. Jennings, Employees participation: Diverse forms and different outcomes, *Academy of Management Review* **13**(1) (1988), 8–22.
- [13] P.H. Dachler and B. Wilpert, Conceptual dimensions and boundaries of participation in organisations: A critical evaluation, *Administrative Science Quarterly* **23** (1978), 1–39.
- [14] R.L. Daft and R.H. Lengel, Information richness: A new approach to managerial behavior and organisational design, *Research in Organizational Behavior* **6** (1984), 191–233.
- [15] R. Dandi and S. Schiavi, Partecipazione alle decisioni e e-mail: un caso aziendale, Conference Paper presented at *IVth Workshop of Italian Organisational Scholars*, Florence, 2003.
- [16] M. Denton and I.U. Zeytinoglu, Perceived participation in decision-making in a university setting: The impact of gender, *Industrial and Labor Relations Review* **46**(2) (1993), 320–331.
- [17] G. DeSanctis and M.S. Poole, Capturing the complexity in advanced technology use: Adaptive structuration theory, *Organization Science* **5**(2) (1994), 121–147.
- [18] V.J. Dubrovsky, S. Kiesler and B.N. Sethna, The equalization phenomenon: Status effects in computer-mediated and face-to-face decision-making groups, *Human Computer Interaction* **6** (1991), 119–146.
- [19] N.A. Euske and K.H. Roberts, Evolving perspectives in organisation theory: Communication implications, in: *Handbook of Organisational Communication. An Interdisciplinary Perspective*, F.M. Jablin, L.L. Putnam, K.H. Roberts, L.W. Porter, eds, Sage Publications, 1987.
- [20] A.B. Fox, D. Bukatko, M. Hallahan and M. Crawford, The medium makes a difference: Gender similarities and differences in instant messaging, *Journal of Language and Social Psychology* **26** (2007), 389–397.
- [21] J. Fulk, Social construction of communication technology, *Academy of Management Journal* **36**(5) (1993), 921–950.
- [22] J.R. Galbraith, Organisational design, in: *Handbook of Organisational Behavior*, J.W. Lorsch ed., Prentice-Hall, Englewood Cliffs, NJ, 1987.
- [23] N. Guèguen and C. Jacob, Solicitation by e-mail and solicitor's status: A field study of social influence on the web, *CyberPsychology and Behavior* **5**(4) (2002), 377–383.
- [24] S.C. Herring, Gender and power in online communication, in: *The Handbook of Language and Gender*, J. Holmes and M. Meyerhoff, eds, Blackwell, Oxford, UK, 2003, pp. 202–228.
- [25] P. Hinds and S. Kiesler, Communication across boundaries: Work, structure, and use of communication technologies in a large organization, *Organization Science* **6**(4) (1995), 373–393.
- [26] G. Hofstede, *Culture's Consequences*, Sage, Beverly Hills, CA, 1980.
- [27] E.A. Locke and D.M. Schweiger, Participation in decision-making: One more look, in: *Research in Organisational Behaviour*, B. Staw and L.L. Cummings, eds, JAI Press, Greenwich, CT, **1** (1979), pp. 265–339.
- [28] G. Mantovani, Is computer-mediated-communication intrinsically apt to enhance democracy in organisations? *Human Relations* **47**(1) (1994), 45–62.
- [29] C.C. Manz and H.P. Jr. Sims, Leading workers to lead themselves: The external leadership of self-managing work teams, *Administrative Science Quarterly* **32** (1987), 106–128.

- 1031 [30] M.L. Markus and D. Robey, Information technology and
1032 organisational change: Causal structuring theory and research,
1033 *Management Science* **34**(5) (1988), 583–598.
- 1034 [31] A.A. Marshall and C. Stohl, Participating as participation:
1035 A network approach, *Communication Monograph* **60** (1993),
1036 137–157.
- 1037 [32] S. McDaniel, G. Olson and J. Magee, Identifying and analyz-
1038 ing multiple threads in computer-mediated and face-to-face
1039 conversation, in: *Proceedings of the Conference on Computer*
1040 *Supported Cooperative Work*, ACM Press, Cambridge, MA,
1041 1996, pp. 39–47.
- 1042 [33] K.I. Miller and P.R. Monge, Participation, satisfaction, and pro-
1043 ductivity: A meta-analytic review, *Academy of Management*
1044 *Journal* **29** (1986), 727–753.
- 1045 [34] T. Mitchell, Motivation and participation: An integration,
1046 *Academy of Management Journal* **16** (1973), 670–679.
- 1047 [35] J.J. Morse and J.W. Lorsch, Beyond theory, *Harvard Business*
1048 *Review* **18** (1970), 61–68.
- 1049 [36] J. Nunamaker, A. Dennis, J. Valacich, D. Vogel and J. George,
1050 Electronic meeting systems to support group work, *Communi-*
1051 *cations of the ACM* **34**(7) (1991), 40–61.
- [37] W.J. Orlikowski, J. Yates, K. Okamura and M. Fujimoto, 1052
Shaping electronic communication: The metastructuring of 1053
technology in use, *CISR Working Paper* No. 274 (1994). 1054
- [38] L. Sproull and S. Kiesler, Reducing social context cues: Elec- 1055
tronic mail in organisational communication, *Management* 1056
Science **32**(11) (1986), 1492–1512. 1057
- [39] L. Sproull and S. Kiesler, *Connections: New Ways of Working* 1058
in the Networked Organisation, MIT Press, Cambridge, CA, 1059
1991. 1060
- [40] G.L. Stewart and C.C. Manz, Leadership for self-managing 1061
work teams: A typology and integrative model, *Human Rela-* 1062
tions **48**(7) (1995), 747–771. 1063
- [41] J.A. Wagner III and R.Z. Gooding, Effects of societal trends 1064
on participation research, *Administrative Science Quarterly* **32** 1065
(1987), 241–262. 1066
- [42] J.B. Walther, Interpersonal effects in computer-mediated inter- 1067
action: A relation perspective, *Communication Research* **19** 1068
(1992), 52–90. 1069
- [43] J.B. Walther, Relational aspects of computer-mediated com- 1070
munication: Experimental observations over time, *Organisa-* 1071
tion Science **6** (1995), 186–203. 1072