

# 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.

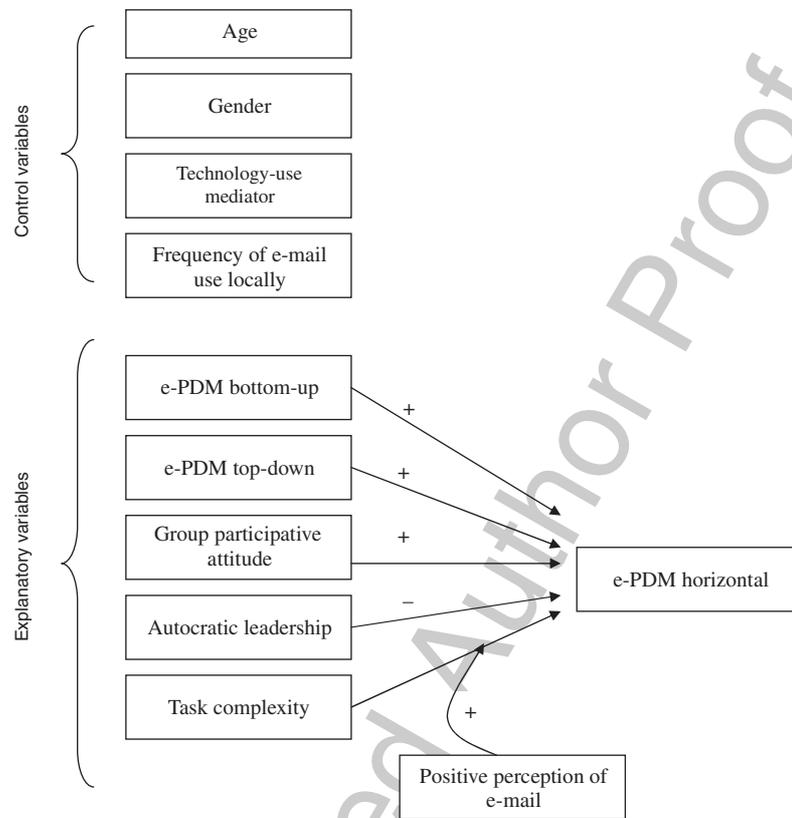


Fig. 1. Contextual factors affecting horizontal e-PDM.

344 IPA is a large and complex organisation with about  
 345 37,000 employees and a geographically dispersed structure  
 346 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

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

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

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

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

*Perception of e-mail features* was measured by a six-items scale. All items used a seven-points scale ranging from “strongly disagree” to “strongly agree”. (The six items were “e-mail allows clear communication”, “e-mail allows quick resolution of problems”, “e-mail makes clear where accountability lies”, “e-mail allows people to avoid conflict”, “e-mail allows criticism expression” and “e-mail reduces hierarchical distance”.) The Cronbach for the six items was 0.71.

*Group participative attitude* was measured by a three-item scale that asked about the group attitude towards participative behaviour. All items used a seven-points response scale ranging from “strongly disagree” to “strongly agree”. (The three items were “responsibilities are shared by all members”, “who raises constructive critics on other colleagues’ work does not 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 hierarchical manager based on Hofstede’s [26] measure of leadership style. The item describes a hierarchical 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 raising difficulties” and then it asks the respondent to assess “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’ demographic characteristics would confound the hypotheses examined in the study we included the following measures 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 participation outcomes. Denton and Zeytinoglu [16] found that women were less likely than men to perceive themselves 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 gender 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 relationships 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<sup>a</sup>

	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

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

<sup>a</sup> $N = 137$ .

Table 2  
Multiple regression analysis<sup>a</sup>

	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> <sup>2</sup>	0.117		0.678	
Adjusted <i>R</i> <sup>2</sup>	0.090		0.655	
$\Delta R^2$	0.117		0.562	

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

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. 910

911 This study presents some limitations. First, we recog- 912  
913 nise the importance of time in organisations, due to the 913  
914 dynamics that are inherent in all social and organisa- 914  
915 tional processes. Our ability to evaluate those changes 915  
916 is severely hindered by a lack of longitudinal data. How- 916  
917 ever this study is only a preliminary step in investigating 917  
918 horizontal e-PDM: our purpose is to integrate our find- 918  
919 ings with subsequent data gathering in IPA. As the 919  
920 learning curves increase and as social joint construc- 920  
921 tion of the technology develops, we expect to witness 921  
922 changes in the members' use of e-mail for participa- 922  
923 tive purposes as Walther suggests [42, 43]. Second, 923  
924 because our research design is cross-sectional, the data 924  
925 from our survey do not allow us to necessarily predict 925  
926 causality. Future research using a longitudinal design 926  
927 is likely to provide important insights on causal rela- 927  
928 tionships among variables investigated in this study. 928  
929 Similarly, since the variables were measured at the 929  
930 same time from the same source, common method vari- 930  
931 ance cannot be fully ruled out. Third, we only analysed 931  
932 e-PDM. Therefore our study does not include compar- 932  
933 isons among media impact on horizontal PDM. Future 933  
934 research might address this comparison by examin- 934  
935 ing electronic and non-electronic peer-to-peer PDM. 935  
936 Finally, we conducted the research in one Italian public 936  
937 organisation. A generalisation of our findings requires 937  
938 further investigation in different organisational con- 938  
939 texts. 939

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