Determinants of user participation: a Finnish survey

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Abstract. The relationship between user participation and information systems success has intrigued researchers for two decades. Despite this history there is minimal research on the antecedents of user participation. The tenet of the present paper is that the conditions of user participation are essentially changing. Especially, the European tradition of user participation has focused on blue collar workers rather than professionals and managers. Users are normally assumed to be computer illiterate. The North American tradition has almost exclusively focused on the impact of user participation on information systems success. The present paper examined the significance of organizational level of users, their task variety and computer experience as determinants of user participation including age, gender, education, computer training, organizational tenure and job tenure as control variables. The three determinants were found to have a significant positive effect on user participation, computer experience emerging as the most dominant factor. Gender, education and computer training were discovered to have significant effects mediated by organizational level, task variety and computer experience.

1. Introduction

User participation is generally considered to be critical to information systems (IS) implementation and success (Hartwick and Barki 1994, Ives and Olson 1984, Igbar and Guimareas 1994, Kappelman and McLean 1991, McKeen et al. 1994, Pettingell et al. 1988). Ives and Olson (1984) reviewed past research in user participation and concluded that ‘The benefits of user involvement have not been strongly demonstrated.’ Additionally, a meta analysis conducted to examine the relationship between user participation and MIS success (Pettingell et al. 1988) concluded that the variables are positively but not strongly correlated. Hawk and Aldag (1990) furthermore, point out that the measurement bias may have overstated the benefits of user participation.

Ives and Olson (1984) propose that more attention should be paid to the antecedents of user participation such as the functional area of the user, previous experience of the user with information systems, attitude of the designer about user participation, functional level of the user, degree of expected use of the information system. Anderson (1985) claims that more consideration should be given to contextual aspects such as users’ knowledge and experience in IS, the structure of applications and tasks to be supported, the change introduced by the system, management’s support for user participation and project leaders’ commitment to and skill in it, users’ possibility to affect outcomes, the acceptability of the time delays associated with user participation, and users’ willingness to participate. The recent review (McKeen et al. 1994) of contingency research on user participation shows that this recommendation has not had much influence. It seems that users are treated as a uniform population who are assumed to have equal expertise and willingness to participate.

A central concern in scientific research is external validity and ‘a key dimension of external validity is international’ (Rosenzweig 1994: 28). Hofstede (1991, 1994) recognizes that many popular management and motivation theories such as Herzberg’s two-factor theory (Herzberg 1966), Maslow’s hierarchy of needs (Maslow 1970) and McGregor’s theories of X and Y (McGregor 1960) reflect the North American culture and argues that their applicability in other cultures is questionable. A review of research on user participation (see section 2) indicates that quantitative empirical research within it has almost exclusively been conducted in North America. The applicability of this body of IS research findings in other cultures is unknown. There has frequently been discussion about international generalizability, with particular attention paid to the
methodological dilemmas of cross-cultural research in IS. Liebenau and Smithson (1991) claim that ‘the social and cultural characteristics of European institutions can be studied as distinct from, or perhaps in contrast to, North American or Japanese institutions’, (p. 1) and research conducted in U.S. business schools and companies may be challenged. It is also suggested that research addressing European concerns should be conducted. Additionally, Aharoni and Burton (1994) in a special issue of Management Science suggest that more research is needed to address the generalizability of management science, where our knowledge in many ways is specific and limited to a given country or a culture. They conclude that since ‘[T]he world has increasingly become a global village, and large, multinational enterprises operate in a globally integrated fashion’ (p. 1), we need to examine whether the findings of these studies conducted in one region, mainly, North America, are valid in other cultures. Despite these concerns, cross-cultural studies in the IS field are quite rare (Straub 1994).

The purpose of this paper is to analyse the significance of organizational level of users, their task variety and computer experience as determinants of user participation in the case of professional and managerial users, including age, gender, education, computer training, organizational tenure and job tenure as control variables. The analysis is based on a survey of 450 professional and managerial users in Finland, balancing in this way the North American bias of quantitative research on user participation.

2. Research on user participation: a review

Bass and Shackleton (1979) distinguish two major trends in participation. The first is industrial democracy and the second participative management. The former is a structural approach that has been more common in Europe. It is formally organized, usually legally sanctioned worker representation at various levels of management. Participative management is a behavioural approach that has been more common in the United States. It is informal sharing of decision making at the work place in which managers involve their subordinates in consensual decision making about matters of importance. These two trends also explain approaches of user participation in the information systems development.

The structural approach stimulated by the idea of industrial democracy has been common in some European countries, especially in Scandinavia. User participation based on ideas of participative management has been more common in North America. These two traditions of user participation have been quite distinct from each other both ideologically and in their research approaches.

In the context of information systems, one can distinguish two traditions of the structural approach to user participation: the socio-technical approach and the trade-unionist approach. The former has its roots in the socio-technical systems design initiated by the Tavistock Institute in the late 1940’s and also in the industrial democracy experiments in Norway (Olerup 1989). ETHICS (Mumford 1971, 1983) is the earliest and likely the best known socio-technical approach to systems development. User participation in ETHICS is largely argued on ethical reasons, as the right of users to control their own destinies also in the work situation (Mumford 1983). The socio-technical tradition has not been so much interested in the success of user participation, but it is assumed to contribute to effective organizational change (Mumford 1983). Hirschheim (1983) reports, however, that organizations who had used a participative approach (ETHICS) did not choose to use it a second time despite the positive attitudes towards the approach.

It was observed early that worker participation in systems development groups may lead to a hostage situation or to an indoctrination situation (Hedberg 1975). In the former, a user with limited background in a computer technology and systems analysis may exert minimal influence on the decision taken. In the latter case, a user representative may be exposed to some introductory course on computers after which he will no longer represent the users, if the course was 'successful'. These concerns led to the emergence of a more radical trade-unionist approach to systems development especially in Scandinavia in the 1970’s (Ehn and Kyng 1987, Hirschheim and Klein 1992). This approach was initially based on a strong ‘class politics’ perspective to organizations (Kling and Scacchi 1982). This Marxist ideology has, however, been weakening recently and the approach is in a transition towards ‘cooperative design’ that is theoretically based on Heideggerian and Wittgensteinian elements rather than Marxist ones (Iivari and Hirschheim 1992). The trade-unionist approach has not been very much interested in the impact of the approach in the IS success. Hirschheim and Klein (1992) note that little research has been done to evaluate how effective it is in developing successful systems. The trade-unionist approach just refers to industrial democracy and quality of working life as design ideals (Ehn and Kyng 1987, Ehn 1988). As opposed to the North American approach, its focus has rather been in antecedents of user participation. It has aimed at developing and experimenting various tools, techniques and principles to support effective user participation.
These more concrete tools, techniques and principles have raised considerable interest lately (Kuhn and Muller 1993). It is difficult to evaluate, however, how effective they are in practice, because experience of them is mainly based on action research projects with considerable research intervention and funding from researchers (Clement and Van den Besselaar 1993). Clement and Van den Besselaar (1993) report on the considerable difficulty of sustaining the continued use of the participatory design approaches after the research intervention.

Reflecting the North American view, Ives and Olson (1984) distinguish two underlying theories of user participation: participative decision-making and planned organizational change. The goal of the former is to increase subordinates’ participation in management decisions that are related to their jobs. Participation is expected to lead to increased job satisfaction and improved productivity (Locke and Schweiger 1979, Locke et al. 1986). Proponents of the planned organizational change view participation as a means for inducing attitude changes which facilitate the planned organizational change by decreasing resistance and increasing prospects of acceptance. Most research in this tradition has focused on the possible influence of user participation on IS success.

The review of Ives and Olson (1984) indicates that the results concerning the relationship between user participation and IS success have been weak and inconclusive. Even though their review is ten years old, to our knowledge more recent research has not essentially changed the situation (Cavaye 1995, Hawk and Aldag 1990, Igbaria and Guimaraes 1994, Kappelman and McLean 1991, Pettingell et al. 1988, Saarinen and Säkkisjärvi 1990, Tait and Vessey 1988). Researchers have suggested possible reasons for the weak correlations between user participation and IS success: (1) methodological weaknesses, and (2) the presence of variables affecting the relationship between user participation and MIS success. Ives and Olson (1984) proposed more attention to the antecedents of user participation. More recent research on user participation as a factor affecting IS success (Alavi and Joachimsthaler 1992, Amoako – Gyampah and White 1993, Baroudi et al. 1986, Doll and Torkzadeh 1989, 1990, Franz and Robey 1986, Guimaraes et al. 1992, Guimaraes and McKeen 1993, Ives and Olson 1984, Mann and Watson 1984, McKeen et al. 1994) confirms this need.

The tenet of the present paper is that much of existing research on user participation has not been able to follow considerable changes in the conditions of user participation. The initial focus of the European tradition has been on blue-collar workers rather than on professionals or managerial end-users, even though the later projects have increasingly concerned offices and service industries (Clement and Van den Besselaar 1993). Users are normally assumed to be computer illiterate without any training in computers and previous experience (Clement and Van den Besselaar 1993). The North American tradition has almost exclusively focused on the impact of user participation on IS success. Users are implicitly assumed to be motivated to participate, an assumption that may be quite problematical. Lucas (1982) for example, claims that participation is ego enhancing, builds self-esteem, can be challenging and intrinsically satisfying, leads to positive attitudes, and allows users to retain the control over their activities. These claims could be expected to increase users’ motivation to participate. We wish to emphasize at the same time the considerable cost of participation. When IS professionals are excluded, the primary job of users is not to participate in systems development, but to do their work as well as possible. This increasingly involves use of information systems. Participation requires time that the participant cannot use in his primary duties, even though participation may increase the users’ qualifications in his primary work in the longer run. Consequently, participation may be perceived more as an obligation than a right by the users.

Ives and Olson (1984) note that research on the antecedents of user participation has been minimal. This paper is an attempt to analyse the effect of some of the potential antecedents of user participation. Our special focus lies in participation of professionals and managers. More specifically, we focus on the influence of their organizational level, task variety and computer experience on user participation including age, gender, education, computer training, organizational tenure and job tenure as control variables. The conceptual framework concerning the relationship between the user participation is introduced in the following section.

3. Conceptual model and research hypotheses

As observed above, there is not much research on the potential antecedents of user participation. Consequently, the present study is highly exploratory in the sense that it aims at identifying possible antecedent factors. The conceptual model of Figure 1 and the tentative hypotheses governing our work are derived from earlier research as far as possible. The selection of the two organizational variables, organizational position and task variety, is based on earlier research on user participation (Edström 1977, Franz and Robey 1986). Ives and Olson (1984) propose previous experience of the user with information systems as one possible
antecedent of user participation. Figure 1 assumes a user’s computer experience and position in the organizational hierarchy to be preceded by a number of variables describing his or her qualifications such as organizational tenure, job/task tenure, education, and computer training. Their inclusion can be justified by the finding of Alavi and Joachimsthaler (1992) that user-situational variables (participation, computer training, DSS experience and work history) form the most important mechanism for improving DSS success. Finally, age and gender are introduced as variables possibly affecting user participation. Age, gender, education and computer training closely correspond to the demographic variables identified by Vaske and Grantham (1990). Differing from Vaske and Grantham (1990) we do not explicitly model attitudes towards behaviour (participation) as an intervening variable between the antecedent variables and user participation. Our main interest lies in task variety, organizational level and computer experience as antecedents of user participation. In order to determine their impact we control the demographic variables, life and work experience (i.e., age, organizational tenure, and job tenure), gender and skills (i.e., education and computer training).

**H1. Computer experience is positively associated with user participation**

As noted above, Ives and Olson (1984) propose previous experience of the user with information systems as one possible antecedent of user participation. To our knowledge this factor was not analysed previously. Lawrence and Loh (1993) include previous experience of computers in their model without analysing its relationship with user participation. They assumed the experience to affect positively end-user satisfaction, but did not find support for that. This contradicts the finding of Alavi and Joachimsthaler (1992) about the importance of experience as a factor affecting DSS success. The positive association between computer experience and user participation can be argued on several grounds. Computer experience increases users’ sense of self-efficacy (Bandura 1982, 1986) related to computers. This can be expected to affect their motivation to participate, since those who distrust their capabilities may be discouraged to participate. Computer experience may also more directly indicate an individual’s interest in computers and motivation to participate. There may also be social pressure in the work environment for the participation of more experienced people.

**H2. Task variety is positively associated with user participation**

Edström (1977) includes a distinction between programmed and not programmed task environments, assuming user influence to be higher in the former case. The data did not support this assumption. Largely contrary to his assumption, Franz and Robey (1986) propose that user participation is greater for less structured types of decision-making tasks, but did not find support for this hypothesis. McKean et al. (1994) found task complexity to be a pure moderator of the relationship between user participation and IS success and the relationship to be significantly stronger in the projects associated with higher task complexity. Participative decision making (PDM) also suggests that more user participation is required as the task becomes more complex. It is asserted that highly complex, unstructured tasks require participative decision making because of the increased knowledge and flexibility required in decision making. An empirical support was also found between task variety and user participation (Guimaraes et al. 1992). Consequently, Hypothesis 2 assumes that development of information systems to support more varied tasks is associated with more user participation.

**H3. Organizational level is negatively associated with user participation**

We interpret ‘user participation’ in this paper as participation by the people who use the systems. Management participation just as superiors of the users (Edström 1977) is not included. The effect of the organizational level on user participation is confounded by the fact that organizational level is presumably correlated with task variety. Franz and Robey (1986), for example, hypothesized that user participation is greater for managerial decision makers at higher levels, arguing that ‘conceivably, more user involvement and participation are required in designing an MIS for
higher-level, less-structured problems' (p. 17), but they did not find support for this hypothesis. Hypothesis 3 assumes *ceteris paribus* organizational hierarchy to be negatively associated with user participation. The negative association is based on the idea of Baronas and Louis (1988) that user participation is a means of increasing or restoring users' sense of control over their work. We assume this motivation for participation to be the less significant the higher the user is in the organizational hierarchy. Further, people higher in organizations have less time to participate.

Our selection of the control variables is primarily based on Alavi and Joachimsthaler (1992). They found that user-situational variables including the work history form the most important mechanism for improving DSS success. Even though this does not directly concern user participation, there are some arguments to emphasize the significance of work history for user participation. Information systems often cross organizational boundaries. They can be understood as an ingredient of the glue that binds the organization together. Organizational tenure, as far as it comprises experience from several positions in the organization, can be very useful in IS development, because it helps to understand the organization as an interdependent system. Task tenure can also be expected to have an effect on user participation. People with a longer tenure in the present task can be expected to be more knowledgeable about the intricacies of their work. Their expertise may be vital for IS development. On the other hand, participation in systems development may be an excellent means of getting acquainted with the work and its wider context. Therefore people with shorter task tenure may be more motivated to participate. In view of the findings of Alavi and Joachimsthaler (1992) it may be interesting to see whether the organizational tenure and task tenure have effects on user participation.

We are not aware of any earlier research on the possible effect of education on user participation. Both education and computer training can be expected to increase people's sense of self-efficacy that may facilitate their participation. The importance of gender in the context of user participation has been emphasized especially in recent participative design approaches (Clement and Van den Besselaar 1993).

### 4. Method

#### 4.1. Sample and procedure

The data for this study was gathered by means of a questionnaire survey administered in Finland during Spring 1993. Even though Finland is culturally a Scandinavian country with a relatively low power distance (rank 46), relatively high individualism (rank 17), relatively low masculinity (rank 47), and somewhat higher uncertainty avoidance (rank 31/32) than Denmark, Norway and Sweden (Hofstede 1991), the trade-unionist approach to user participation has had much weaker footing in Finland than elsewhere in Scandinavia. There are some formal agreements concerning user participation between trade unions and corresponding employer organizations in Finland, but the agreements have not effectively guided user participation. To summarize, user participation in Finland is governed by all the four traditions mentioned in the Introduction.

Initially, a sample of the top 120 companies in Finland (*Talouslääma* 1992) was selected for the survey. Because of mergers, bankruptcies and problems in getting in contact, the participants were drawn from a sample of 86 corporations in Finland. Out of the 86 companies contacted, 81 agreed to participate in this study. The number of employees in the 81 companies varied between 89 and 28,859 (on average 4913); and the corporation's net sales ranged from 639 million Finnish marks ($127 million) to 57 billion Finnish marks ($11.4 billion) (*Talouslääma* 1993). The sample of the corporations was drawn from a number of industries and many corporations included multiple industries.

Within each company, contact persons were identified and were reached by telephone to inform them of the purpose of this study and to identify the individuals who would be participating. The contact persons were usually IS managers. Contact persons in the participating companies were asked to distribute the surveys to individuals who were not EDP professionals or intermediary users (secretaries) and who used computers in the execution of their job. Participation in the study was voluntary and people were assured that their individual responses would be treated as confidential. Ten questionnaires were sent to the contact person in the 81 participating companies, except in the case of two companies, the total of questionnaires mailed being 806. It was up to the contact person to decide to whom to distribute the questionnaires. The questionnaires were returned directly by the respondents. The exclusion of incomplete and returned questionnaires resulted in a final sample of 450 users, a response rate of 55.8 percent.

The respondents were largely employed in two major industries: manufacturing (50%) and merchandising (30%). They held professional/non-managerial (51.9%) and managerial positions. The majority of the managers were middle managers (25.2%) and first level supervisors (16.7%). Top management/executives represented 3.1% and 3.1% were unclassified. The respondents
represented a wide range of functional areas including accounting and finance (30.3%), marketing and sales (14.1%), technical fields (17.7%), such as operations and production, R&D, engineering, and IS, personnel and general management (13.6%), and others (24.6%). Of the 450 participants, 53.6% of the participants were males and 46.4% were females. Age ranged from 21–61, and the mean age of the respondents was 38.92 years (S.D. = 8.32). Approximately 45.3% of the participants had completed some college education, and an additional 35% of the participants were college graduates. The average length of service in the current organization (organizational tenure) was 10.45 (S.D. = 8.31) and the length of tenure in their current job averaged 5.46 (S.D. = 5.32).

4.2 Measures

User participation. User participation was measured by asking users how much they actually participated in the following activities: (1) initiating the project, (2) determining system objectives, (3) determining the user’s information needs, (4) assessing ways to meet users’ information needs, (5) identifying sources of information, (6) outlining information flows, (7) developing input forms/screens, (8) developing output formats, and (9) determining availability/access to the system. The eight activities were selected from Doll and Torkzadeh’s (1989) concept of user participation. The response options, anchored on a five point Likert-type scale, ranged from (1) not at all, to (5) a great deal. The internal consistency reliability (coefficient alpha) of the scale as used in this study was 0.95.

Computer training. Computer training was measured by individual’s responses to five questions which asked them to report the extent of training in computers they had received from five sources: university colleges; community (vocational) college; vendor training; in house training; and self training. The total number of training programs represented computer training.

Education. The measure for education consisted of six levels: (1) some high school, (2) trade (vocational) school, (3) high school, (4) some college, (5) Bachelor’s degree, and (6) graduate or professional degree.

Computer experience. Computer experience was assessed by seven items asking respondents to indicate the extent of their experience using different types of computer software and languages.

Task variety. Task variety referred to the amount of variety found in the job itself, i.e., the extent to which tasks are not ‘repetitive and routine’ and with clearly defined procedures and methods (Igbaria 1990). House and Dessler’s (1974) four-item task structure scale was used to operationalize this variable. Individuals were asked to indicate to what extent a task is repetitive, similar, varied, and unambiguous on a five-point Likert type scale ranging from (1) very little, to (5) almost completely. The internal consistency reliability of the scale is 0.85.

Other single item questions were used to ascertain respondent’s gender, organizational level, age, organizational tenure, and job tenure. Gender was assessed with a fixed response item (1 = female; 2 = male). Level in the organizational hierarchy consisted of: (1) professional employee without supervisory responsibilities, (2) first level supervisor, (3) middle management, and (4) top management and executives. Age, organizational tenure and job tenure were measured in years. The demographic variables were included in the background information section of the survey.

4.3 Data analysis

The technique of path analysis using least square multiple regression was used to determine whether the observed pattern of relationships among the variables was consistent with the proposed hypotheses presented above. It is important to state that our hypotheses imply that we need to control for demographic variables, mainly work/life experience (i.e., age, organizational tenure, and job tenure), gender, skills (i.e., education and computer training). This involves using hierarchical multiple regression (Cohen and Cohen 1983). In this manner, we used hierarchical multiple regression to assess the effects of the study variables on user participation. We first regressed user participation on demographic variables as control variables, adding computer experience in step 2. In a similar manner, user participation was regressed on demographic characteristics in the first step and organizational level added in step 2. We also regressed user participation on demographic characteristics in step 1 and task variety in step 2. Finally, we regressed user participation on demographic variables in step 2 and the three independent variables (i.e., computer experience, organizational level, and task variety) were added in step 2. In each analysis the significance of the beta weights for the hypothesized independent variables was examined to determine support for the hypothesis.

The beta weight of the independent variable in the first three separate regression equations, where user participation was regressed on the demographic variables in step 1 and one of the independent variables was added in step 2, represents the total effect of the independent variable on user participation, whereas the final beta weight, calculated after all the variables
have entered the analysis, represents the direct effect of the independent and control variables.

5. Results

The intercorrelations among the study variables are shown in Table 1. The correlations reveal that user participation is strongly correlated with skills (training and education) and gender. It is noted that user participation had no significant correlation with work/life experiences (age, organizational tenure and job tenure). Table 1 also shows that computer experience is very strongly correlated with user participation. Organizational level and task variety were also found to positively correlate with user participation. Examination of the intercorrelations among the study variables revealed no evidence of extreme multicollinearity (i.e. \( r's < 0.80 \)).

The results of the hierarchical multiple regression analysis testing the three independent variables are presented separately in Table 2. The data show that the demographic variables explained 16% of the variance in user participation. Among them, gender explained 7% \((p \leq 0.001)\) and each of the skills indicators, i.e., education and training, 4% \((p \leq 0.001)\) of the variation in user participation. Table 2 reveals that computer experience explained an additional 9% \((R^2 = 0.25, p \leq 0.001)\) of the variance in user participation. Task variety and organizational level were also able to explain a significant portion of the variance in user participation \((\Delta R^2 = 0.02 \text{ and } 0.01, p \leq 0.05, \text{ respectively})\). Data from Table 2 show that the three independent variables had significant total effects on user participation. The strongest effect is noted for computer experience \((\beta = 0.35, p < 0.001)\). Smaller but significant effects are observed for task variety \((\beta = 0.17, p \leq 0.01)\) and organizational level \((\beta = 0.13, p \leq 0.05)\). Among the control variables, it is noted that the total effects of gender \((\beta = 0.27, p \leq 0.001)\) and skills (training and education, \(\beta = 0.22 \text{ and } 0.21, p \leq 0.001, \text{ respectively})\).

Table 3 shows the effects of all the study variables when the control variables entered in step 1 and the three independent variables were added to the regression

![Table 1. Intercorrelations among the study variables.](image)

<table>
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<th></th>
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<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Age</td>
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<td>2.</td>
<td>Gender</td>
<td>0.17**</td>
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<td>3.</td>
<td>Education</td>
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<td>0.23**</td>
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<td>4.</td>
<td>Organization tenure</td>
<td>0.65** 0.05 -0.30**</td>
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<td>5.</td>
<td>Job/task tenure</td>
<td>0.44** -0.04 -0.35** 0.54**</td>
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<td>6.</td>
<td>Computer training</td>
<td>-0.25** 0.11* 0.26** -0.16** -0.09</td>
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<td>7.</td>
<td>Computer experience</td>
<td>-0.19** 0.23** 0.30** -0.15** -0.17** 0.40**</td>
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<td>8.</td>
<td>Task variety</td>
<td>0.04* 0.28** 0.39** 0.04 -0.13** 0.16** 0.17*</td>
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<tr>
<td>9.</td>
<td>Organizational level</td>
<td>0.26** 0.34** 0.29** 0.06 -0.08 0.05 0.06 0.32**</td>
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<td>10.</td>
<td>User participation</td>
<td>0.03 0.26** 0.24** -0.00 -0.07 0.26** 0.42** 0.23** 0.28**</td>
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\( *p < 0.05; **p < 0.01 \)

![Table 2. The effects of the study variables on user participation: regression equations predicting user participation.](image)

<table>
<thead>
<tr>
<th></th>
<th>Control variables</th>
<th>With computer experience</th>
<th>With task variety</th>
<th>With organizational level</th>
</tr>
</thead>
<tbody>
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<td>1.</td>
<td>Age</td>
<td>-0.01</td>
<td>0.13*</td>
<td>0.03</td>
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<tr>
<td>2.</td>
<td>Gender</td>
<td>0.27**</td>
<td>0.09*</td>
<td>0.16**</td>
</tr>
<tr>
<td>3.</td>
<td>Education</td>
<td>0.21**</td>
<td>0.12*</td>
<td>0.11*</td>
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<td>4.</td>
<td>Organizational tenure</td>
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<td>0.07</td>
<td>0.09</td>
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<td>5.</td>
<td>Job/Task tenure</td>
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<td>-0.05</td>
<td>-0.06</td>
</tr>
<tr>
<td>6.</td>
<td>Computer training</td>
<td>0.22**</td>
<td>0.10*</td>
<td>0.20**</td>
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<tr>
<td>7.</td>
<td>Computer experience</td>
<td>0.35**</td>
<td></td>
<td>0.17*</td>
</tr>
<tr>
<td>8.</td>
<td>Task variety</td>
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</tr>
<tr>
<td>9.</td>
<td>Organization level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.16**</td>
<td>0.25**</td>
<td>0.18**</td>
<td>0.17**</td>
</tr>
</tbody>
</table>

\( *p < 0.05; **p < 0.01 \)
model in step 2. This represents the direct effects of the study variables on user participation. The independent variables, computer experience, organizational level and task variety, had significant direct effects ($\beta = 0.35$, $p < 0.01$, $\beta = 0.11$ and $\beta = 0.14$, $p < 0.05$, respectively). The data in Table 3 also show that only computer training among the control variables remained significant after entering all the independent variables. This suggests that the independent variables, mainly computer experience, may mediate the relationships between the control variables, i.e., the demographic variables, and the independent variables. An examination of the correlations between the control variables and the independent variables reveals that gender is strongly correlated with computer experience ($r = 0.23$, $p < 0.001$), organizational level ($r = 0.34$, $p < 0.001$) and task variety ($r = 0.28$, $p < 0.001$). This indicates that men in our sample had more computer experience and held higher position in the organization and worked on a greater variety of tasks than women. Skills were also found to be highly correlated with the independent variables, where education and computer training are positively correlated with computer experience ($r = 0.30$ and $0.40$, $p < 0.001$, respectively), and task variety ($r = 0.39$ and $0.16$, $p < 0.01$, respectively) and organizational level ($r = 0.29$, $p < 0.001$ and $0.05$, NS, respectively). These suggest that computer experience, organizational level, and task variety may mediate the relationships between gender and skills and user participation. It is noted that the three independent variables had strong effects on user participation after controlling the demographic characteristics. Further, among the demographic characteristics, gender and skills had significant total effects on user participation, but no significant direct effects were found. Finally, organizational and life experiences (i.e., age, organizational tenure, and job tenure) had no significant effects on user participation.

### Table 3. The effects of all the study variables on user participation.

| 1. Age     | 0.04     |
| 2. Gender  | 0.08     |
| 3. Education | 0.05    |
| 4. Organizational tenure | 0.08    |
| 5. Job/Task tenure   | 0.03     |
| 6. Computer training | 0.09*    |
| 7. Computer experience | 0.35**  |
| 8. Task variety     | 0.14*    |
| 9. Organizational level | 0.11*   |
| $R^2$             | 0.28*    |

*p < 0.05 **p < 0.01

6. Discussion and conclusions

This paper focused on three potential antecedents of user participation: computer experience, task variety and organizational level. Life/work experience (age, organizational tenure, job tenure), gender and skill (education and computer training) were included as control variables. The results emphasize the pivotal role of computer experience as an antecedent of user participation. It alone explained nine percent of the variance in user participation. The significance of computer experience on user participation is, of course, easy to understand. It may be instructive to note that when computer experience is excluded from the full regression equation, gender, education, and computer training retain their significance. This indicates that it is mainly computer experience that mediates their effects on user participation.

In accordance to Hypothesis 2 task variety was found to have a significant positive effect on user participation, even though it was able to explain only two percent of the variance in user participation when entered after the control variables. This finding sheds light on the controversial relationship between task variety and user participation as discussed in the section on conceptual model and research hypotheses. It supports the hypothesis of Franz and Robey (1986) that ‘more user involvement and participation are required in designing an MIS for higher-level, less-structured problems’ (p. 17). When task variety is low developers may proceed almost independently of the user. On the other hand, if task variety is high, unexpected events may require changes to the original specification and the need for user participation is crucial (McKeen et al. 1994).

Organizational level also had a significant positive effect on user participation. The total effect is partly explained by the positive correlation between organizational level and task variety ($r = 0.32$, $p < 0.001$). The positive direct effect contradicts Hypothesis 3. The positive effect is also confirmed by the partial correlation between organizational level and user participation when task variety is controlled ($r = 0.16$, $p < 0.001$). The negative association between the organizational level on user participation was argued referring to the idea of Baronas and Louis (1988) that user participation is a means of restoring a sense of control over their work. Hypothesis 3 assumed that *ceteris paribus* this motivation is less significant at higher levels in the organizational hierarchy. There are a number of potential explanations for this inconsistency. Firstly, although we were not interested in management participation just as superiors of the users, we were not able to eliminate this component from our measure of user participation. This may exaggerate the amount
of user participation reported. Secondly, our perceptual measure of user participation ranging from 'not at all' to 'a great deal' may not measure absolute participation (e.g., time) but respondents may relate it to the time they have available for the participation and to their influence. This also can be expected to exaggerate the amount of participation at the higher level. The positive direct effect nevertheless justifies additional research.

Among the control variables, only gender, education and computer training were discovered to have significant total effects on user participation. The total effect of gender is explained by the finding that men, in our sample, had more computer experience and held higher positions in the organization and worked in a greater variety of tasks than women. Education also had significant positive correlations with computer experience, organizational level and task variety. The correlation between computer training and computer experience explains the former's effect on user participation. As observed above none of them had direct effect on user participation.

Neither organizational tenure nor task tenure had a significant total effect on user participation. In view of the finding of Alavi and Joachimsthaler (1992) that usersituational variables including work history form the most important mechanism for improving DSS success, this imposes an interesting challenge, i.e. how experienced people gain knowledge of the organization and tasks to be supported by the information system to participate.

The above findings were based on a survey in one country, Finland. Even though this can be considered a contribution, more research is needed to examine the antecedents of user participation in North America and other countries. In this study, user participation was measured using a perceptual measure. As discussed above it may bias the results. Further research using alternative measures is invited. Finally, this study analysed only the antecedents of user participation without attention to the success of participation. An interesting question for further research is to examine whether user participation plays a major role in mediating the effects of computer experience, organizational level and task variety and IS success.

The significance of computer experience as the determinant of user participation has clear practical implications. In view of the fact that user participation means additional computer experience, the two variables may form a positive cycle in which one reinforces the other. The correlation analysis revealed that all the variables of life/work experience (age, organizational tenure and job tenure) correlated negatively with computer experience, whereas skill (education and computer training) correlated positively with it. Gender also had a significant correlation with computer experience, with men exhibiting higher scores. These results raise older female employees with a long organizational and task tenure as a critical group from the viewpoint of user participation. They were also found to have lower education. The results as such do not tell whether this bias is the result of discrimination, in which the participation is considered by those deciding about it as the domain of young educated, male employees with a short tenure or whether the question is about self-selection. In view of the fact that information systems concern the daily work of a large part of employees, this bias deserves additional research. The results of the correlation analysis and the hierarchical regression analysis picked computer training as a variable with a positive relationship with user participation. Taken together, these findings emphasize the need for intensified computer training and subsequent increased experience as vehicles to increase individuals' participation in the IS activities, especially in the case of those employees who are in a weaker position with regard to participation. The results also suggest that the significance of organizational and job experience in the development of successful information systems may not be understood. Even though a long tenure may be an inhibitor of a new way of thinking and innovativeness, a critical question is whether this is an indicator of thin application domain knowledge and superficial understanding of the work to be supported when developing new systems.

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Notes

1 Following Barki and Hartwick (1989) we prefer the term 'user participation' to 'user involvement' when speaking about the activities and behaviours of users in systems development.

2 The only difference is that they identify prior experience with computers instead of computer training. As explained above, computer experience was introduced as an independent variable instead of a control variable.

3 Hofstede's (1991) comparative analysis comprises 50 countries and 3 regions. He also has a fifth dimension, long-term orientation, but Finland is not included in his analysis of 23 countries.
4 Later Barki and Hartwick (1994) have published an alternative measure for user participation which was not available at the time of the survey.

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